

TRANSACTIONS
OF THE
DUBLIN SOCIETY.

V O L. III.

FOR THE YEAR MDCCCII.

Hoc Anno (1736) ad ornandam agriculturam Societas coaluit
Dublini, quæ hebdomodatim suas adnotationes edidit, & prima est
Societatum, quæ ad agricolendi artem colendam coaluerunt.

ALBERTUS VON HALLER. *Bibliotheca Botanica*, p. 287.

Published by Order of the Rt. Hon. the Dublin Society.

Dublin

PRINTED BY GRAISBERRY & CAMPBELL, BACK-LANE.

1803.

Jos: Banks

THE Society desires it to be understood, that, as a body, they are not responsible for any opinion or representation of facts contained in the following papers, and will be much obliged to any gentleman, farmer, or other person, that will be pleased to point out any error or improvement in the several matters treated of, by letters addressed to their Acting Secretary, the Rev. Dr. LISTER, Hawkins'-street, Dublin.

CONTENTS.

	Page
<i>The PETITION of the DUBLIN SOCIETY to the</i>	
IMPERIAL PARLIAMENT. -	1
PREMIUMS offered by the DUBLIN SOCIETY.	21
<i>For planting ten acres or upwards.</i> -	23
— — — — — <i>Oak, or Larch.</i> - -	25
— — — — — <i>Sweet Chesnuts.</i> - -	28
— — — — — <i>By contract.</i> - -	29
— <i>Saving larch and Scotch fir seed.</i> -	31
— <i>Answering at public examination in Botany.</i>	34
— <i>Producing native plants not hitherto des-</i>	
<i>cribed.</i> - - - - -	36
— <i>Procuring grass seeds.</i> - -	37
— <i>Answering at public examination in mine-</i>	
<i>ralogy.</i> - - - - -	39 ✓
— <i>Fine arts.</i> - - - - -	43

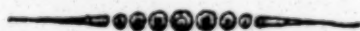
BOARD OF AGRICULTURE.

	Page
<i>Experiments proposed by the Board.</i> -	53
✓ <i>Premiums offered by the Board.</i> -	62



LONDON SOCIETY.

<i>Premiums offered by the Society.</i> -	71
---	----



BOUNTIES and premiums paid by the DUBLIN	
SOCIETY. - - - -	121
<i>A list of the members, officers &c. of the So-</i>	
CIETY. - - - -	125



COMMUNICATIONS MADE TO THE SOCIETY.

<i>DIARY of the weather and state of vegetation</i>	
<i>monthly at the Botanic Garden, by Mr.</i>	
<i>Underwood.</i> - - -	1
<i>Catalogue of trees, shrubs, &c. injured by the</i>	
<i>frost in May 1802, by the same.</i> -	91
<i>Appendix to the General Botanical Catalogue of</i>	
<i>the Society's garden, by the same.</i> -	109
<i>Experiments on potatoes, by the same.</i> -	135

FURTHER

CONTENTS.

v

FURTHER COMMUNICATIONS.

	Page
<i>An Essay on Drill husbandry, by Lieut. Col. Hardy.</i>	1
<i>Description of an Instrument for levelling ground, by the same.</i>	44
<i>Observations on husbandry, by a Member.</i>	49
<i>An account of the Straw-hat manufactory, at Newport-pratt, county of Mayo, by the Rev. Dr. Graydon.</i>	55
<i>Second letter from the Rev. Mr. Moore, on raising potatoes by planting cuttings of the stalk.</i>	74
<i>A letter from Norman Steele, Esq. relative to premiums for rearing cattle.</i>	77
<i>Second Report on the Wicklow gold mines, by Abraham Mills, Esq.</i>	81
<i>Questions relating to natural and civil history, &c. by John Templeton, Esq.</i>	100
<i>A letter from John Pollock, Esq.</i>	112
<i>A letter from Joseph Cooper Walker, Esq. with Extracts from his outlines of a plan for promoting the art of painting in Ireland.</i>	115
<i>A letter from the Rev. Dean Digby, on the culture and saving of the seed of red clover.</i>	135
<i>A letter from Clement Archer, Esq. on some breeds of sheep.</i>	142
	Marine

	Page
<i>Marine plants, observed on the coast of the county of Wexford, by William Tighe, Esq.</i>	147
<i>A letter from Robert Scott, Esq. M. D. Professor of Botany in Trinity College, on some native plants of Ireland.</i>	157
<i>A letter from John Templeton, Esq. on a new species of rose.</i>	162
<i>A letter from a Member, on an old map of Ireland.</i>	168
<i>On the Syphon applied to the Worm tub as a refrigerator, by Mr. Alexander Johnston.</i>	173

EXTRACTS.

<i>A Memoir on roots growing in the inside of trees, by Mr. J. F. Dryfhout.</i>	1
<i>Extract from a Memoir by M. Gerard, on plants with double fructification.</i>	35
<i>On County Reports of improvements.</i>	49
<i>A Note of various measures, calculated for the improvement of the county of Caithness.</i>	50
<i>Messrs. Collard and Fraser's process for preparing the weld yellow.</i>	60
<i>Description of a blow-pipe.</i>	65
✓ <i>Description of the blow-pipe apparatus of Haas.</i>	69
<i>On feeding sheep on potatoes, by Mr. Bartley.</i>	73
<i>Experiments</i>	

CONTENTS.

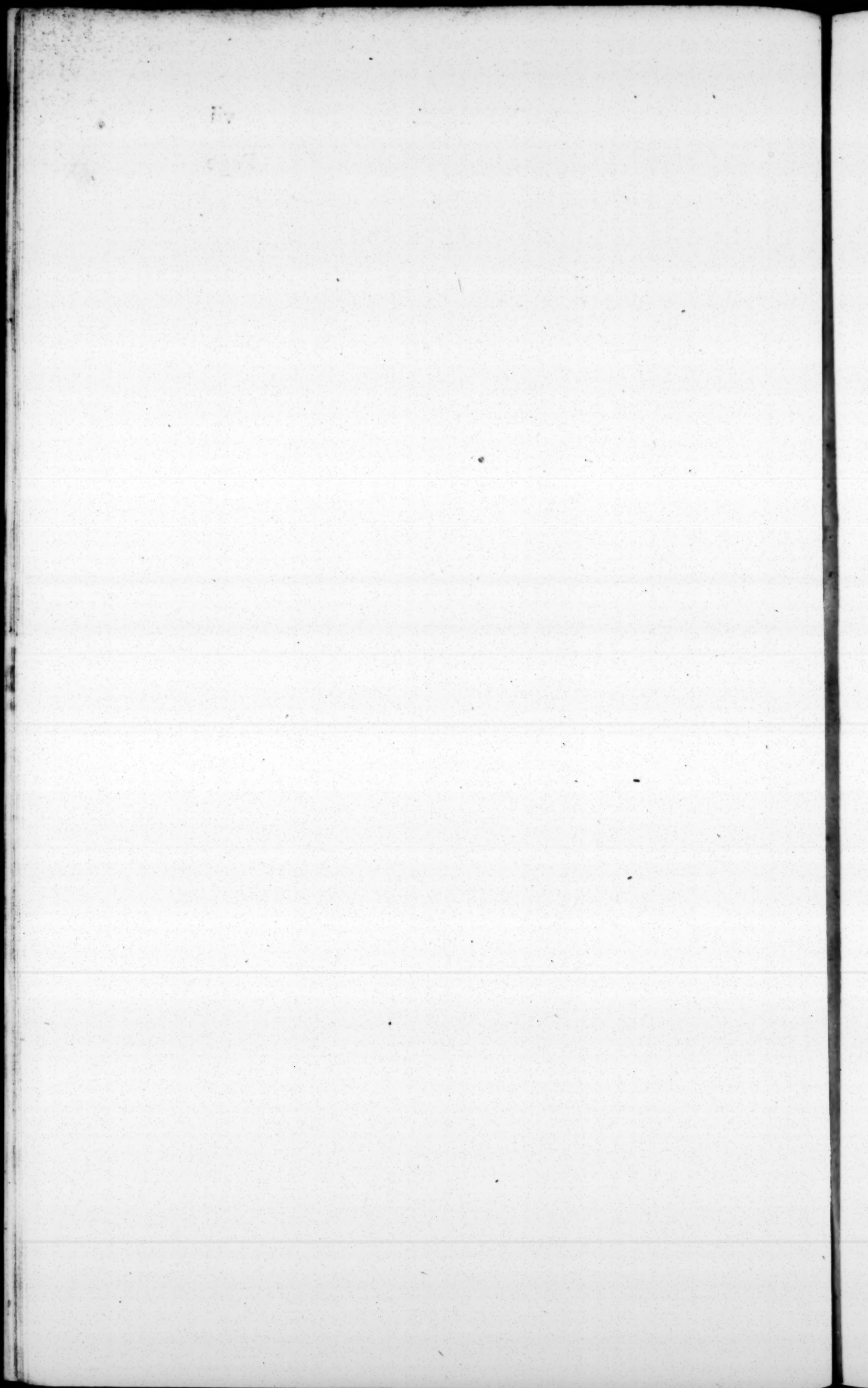
vii

Page

<i>Experiments and observations on certain stony and metalline substances, by Edward Howard, Esq.</i>	- - - - -	81
<i>Extract from Millin's Magazin Encyclopedique, on the same subject.</i>	- - - - -	146
<i>The speech of the Right Hon. Lord Carrington, delivered at the Board of Agriculture.</i>		161

Add to CONTENTS of EXTRACTS.

*A Memoir on the means of rendering Smutty
Wheat fit for market, and for making Bread
—page 151.*



TO THE
RIGHT HONOURABLE AND HONOURABLE
THE KNIGHTS, CITIZENS, AND BURGESSES,
IN THE
IMPERIAL PARLIAMENT ASSEMBLED.
THE HUMBLE PETITION
OF THE
DUBLIN SOCIETY,
FOR PROMOTING
HUSBANDRY
AND OTHER USEFUL ARTS IN IRELAND.

Sheweth,

THAT their Society was formed in the year 1731, and was incorporated by his late Majesty in 1749, by the title of the Dublin Society for promoting Husbandry and other useful Arts in Ireland.

THAT their only fund was the small amount of their own subscriptions until 1749, when his Majesty was graciously pleased to grant them 500l. a year on his civil establishment, and Parliament has uniformly added its bounty every Session since.

B

THAT

THAT they cannot explain to this Honourable House the several objects under their care more clearly, than by stating their petition to the House of Commons of the Irish Parliament, in their last Sessions, which was as follows, viz.

“ To the Right Honourable and Honourable the Knights, Citizens, and Burgeffes, in Parliament assembled.

THE PETITION of the Dublin Society, for promoting Husbandry and other useful Arts in Ireland,

Humbly Shewth,

THAT your Petitioners were incorporated by his late Majesty in the year 1749, under the stile and title of the Dublin Society for promoting husbandry and other useful arts in Ireland.

THAT aided by his Majesty's royal bounty of 500l. a year, and by the successive bounty of Parliaments in addition to their own private subscriptions, they have constantly endeavoured to promote the beneficial objects of their institution, by applying the same in premiums and other means for promoting agriculture, arts, and manufactures, and they have the satisfaction of seeing that their endeavours have not been fruitless : many millions of trees have
been

been planted, many large and extensive nurseries have been formed in divers parts of the kingdom under their premiums, and the emulation, which has arisen among gentlemen of ornamenting and improving the value of their estates, has been sufficiently encouraged by the cheapness of price, and facility of acquiring young trees, which those nurseries have produced. Their endeavours too, for improving agriculture and manufactures, though much restrained by the limited state of their funds, have not been unsuccessful. And they have lately purchased the celebrated *Leskean* collection of minerals, and built rooms for its reception, and for the accommodation of those who wish to study the science, contiguous to their Repository in *Hawkins'-street*, at an expence far beyond their ordinary means. With a view of promoting further the means of acquiring knowledge, they have built a very complete Chemical laboratory, furnished with all necessary apparatus, and established a professor of great ability to make experiments and give lectures in that science, through which manufactures have received of late years the most decisive and rapid improvements; but they want rooms and buildings for experiments, where new methods of tanning, brewing &c. may be executed for the examination of the public.

public. They have also, under the encouragement and sanction of the Legislature, procured land at *Glasnevin*, which they have furnished, and are continuing to furnish with various arrangements of plants, for the purpose of promoting a practical knowledge of Botany so far as it is useful to the farmer, the grazier, the planter, and the artificer, a knowledge hitherto much neglected in this kingdom, but very essential for forming a complete and profitable acquaintance with land and its products. They have appointed a professor of skill and eminence to lecture on those plants, and on the various uses of all, which are natives of Ireland; how far each is nutritious or injurious to each species of cattle, or can afford means of dyeing colours, or be useful in manufactures. They have in contemplation the extending of their ground there so as to procure the power of water, which goes through it, for the purpose of trying experiments, and giving practical proof of the utility and application of many modern inventions in mechanics for shortening labor in agriculture, arts, and manufactures. That they likewise propose to erect sheds for their ploughs and implements of husbandry, and to appropriate a field there, where country gentlemen and farmers may have ocular demonstration of their effects. They also
hope

hope to rear, and cultivate the spirit of improving, the breed of all sorts of cattle in this kingdom, by exhibiting there the best approved animals for breed, which will require several stalls and divided yards to be built there: but the purchase of the ground, the preparing it, the furnishing it with plants, and the fitting up rooms there for a Botanic library and for lecturing, have so far exhausted their funds, that without a considerable encrease of bounty now, and an annual addition to the usual bounty of Parliament, they fear they cannot maintain the institution, much less carry it to perfection, consistent with a due attention to the other objects of their incorporation. And they have further applied themselves to the establishment of a Veterinary Institution, for promoting a knowledge of the diseases, the cures, and the treatment of horses and other cattle, a similar Institution to which is now established in London, and supported by the bounty of the British Parliament; and they have accordingly held out the prospect of sufficient encouragement to induce a professor in that art, to settle in this kingdom and instruct in it: but without rooms for dissection and lecturing, stalls, or stables, in the way of an hospital, as well for black cattle, sheep, and swine, as for horses, their efforts must be in vain, and without

out the means of defraying their expence, they must stop.

THAT their drawing schools, which have produced many useful Artists for the improvement and credit of Irish manufactures, were so confined in *Grafton-street*, that it was impracticable to extend them there, from which circumstance, and the more easy superintending of them, and their many repositories for national improvement established in *Hawkins'-street*, they found it necessary to remove entirely there from *Grafton-street*, more particularly as they have in *Hawkins'-street* a very extensive collection of agricultural implements, and a very valuable library of books relative to all learning, necessary for the objects of their institution; all which, together with their laboratory and Leskean museum will be better and more œconomically taken care of by the Society and its Committees meeting there, and a spirit of improvement may be encouraged by the frequent opportunities, which their meetings there will afford to the persons attending them of seeing and examining. They have therefore sold their concerns in *Grafton-street*, and have already expended the money, arising from the sale, on their buildings in *Hawkins'-street* and at *Glasnevin*. They did also order about a year ago a valuation to be made of
ground

ground adjoining their present concerns in *Hawkins'-street*, under the authority of Parliament, with intent to purchase a sufficiency thereof for many of the aforesaid objects, but not nearly adequate to embrace them all; being restrained in their intentions by the great inadequacy of their funds. Thus all the ground they wish for, to answer fully every purpose they have stated to be in their view near *Hawkins'-street* for drawing schools, rooms for their meetings, for exhibition of their works and ingenious inventions of Irish artists, and for a complete establishment of a Veterinary school, is comprehended under the grounds demised by Trinity College to the Bishop of Raphoe, and the title to which, as well of the College as of the said Bishop, has been since purchased, and is now vested in the Commissioners of Wide streets under act of 39. Geo. III. C. 53. And your Petitioners observe with much gratification, that the Legislature has enacted in the 26th. section of the said act, that, as part of the said ground there belonging to the College and the said Bishop might hereafter be required for certain public purposes, the said Commissioners should not alienate, dispose of, set, or sell such parts of the said ground as lie between *Poolbeg-street* and *Townsend-street*, and are bounded on the west
by

by *Hawkins'-street*, during seven years after passing of the act, except for such public purposes. That your Petitioners humbly apprehend the public purposes, which were in contemplation of the Legislature when they passed said clause, were those which are here stated, and which they humbly pray a grant of said grounds for effectuating, together with such sum as may be necessary for purchasing out the tenants interests, which they understand are expirable, and the houses mostly small and out of repair.

THAT for the further execution of their trust, and promoting agriculture, they beg leave to submit the expediency of being empowered to send persons throughout the kingdom to make Agricultural Surveys of each county in the same manner as has been done in Britain by the Board of Agriculture there ; in order that by a knowledge of the defects, or of any profitable practice in any place, they may be able to remedy the one, or to diffuse and extend the other, and may have the means of a continued correspondence with all parts, so as to suit their exertions from time to time, where necessary, with efficacy and a surer prospect of success.

They

They do therefore with all humility submit their situation to this Honourable House, whose liberality they have so long experienced ; earnestly praying such aid as may enable them to proceed in the great objects which they have stated, and at the same time maintain all the other ends of their Institution."

THAT the said House did thereupon in their bounty and wisdom continue to your petitioners the usual annual grant of 5500*l.* and expressed its approbation of the several objects in the petition, as well those proposed to be undertaken as those in actual progress, by making to them a further grant of 10,000*l.* towards enabling them to carry into execution the very useful objects for the improvement of agriculture, arts, and manufactures, mentioned in their Petition to that House, as is set forth in their vote of the 20th of March, 1800.

THAT in furtherance of said objects, particularly the Veterinary establishment, the following provision was inserted in an act of the said session, entitled,

" An Act to amend and explain an act
" passed in the 39th year of the reign of
" his present Majesty, entitled an Act to
" grant certain duties therein mentioned
" to his Majesty to be applied to the pur-
" pose

“ pose of making wide and convenient
“ ways, streets, and passages in the city of
“ Dublin, and for enabling the Commis-
“ sioners therein mentioned more effect-
“ ally to execute the trusts reposed in
“ them.”

Sect. 4. “ And Whereas by said Act it is enact-
ed, after reciting that part of the ground
therein mentioned, belonging to the Pro-
vost, Fellows, and Scholars of Trinity Col-
lege, may be thereafter required for certain
public purposes, that, when the Commis-
sioners therein mentioned should have pur-
chased certain grounds and tenements
therein recited, and that the same shall be-
come vested in them, they should not alie-
nate, dispose of, set or sell such parts of the
said ground, as lie between *Poolbeg-street*
and *Townsend-street*, and are bounded on
the west by *Hawkins'-street*, for the full
term of seven years from the passing of the
said act, save and except for such public
purposes. Be it further enacted, that the
said Commissioners shall proceed with all
convenient speed to value the interest of
all the several persons, deriving immediate-
ly or otherwise under the said Bishop of
Raphoe, in the afore described part of the
said grounds, and shall in such valuation
proceed



proceed in like manner, and shall have and exercise, and are hereby vested in respect to the same, and to the purchase thereof, with all and every the powers vested in them by law for opening any new street, or widening any old street in the said city of Dublin."

Sect. 5. "THAT it shall and may be lawful for the said Commissioners to set unto the Dublin Society, and they are hereby authorized to set unto the said Society, all the part of the said ground so described, when the same shall be vested in them, or such part thereof as the said Society shall desire to be taken at such rent in perpetuity, as shall be agreed upon between them and the said Society; and that it shall be lawful for the said Commissioners to set, sell, alienate, or dispose of such part of the said ground as the said Society shall under their seal certify to them that they do not desire to take by lease, any thing in the said recited Act to the contrary notwithstanding."

THAT the Commissioners therein named immediately proceeded to a valuation of said grounds, the annual rents of which they have settled at £.842, 8s. 8d. being £.200 for the ground rent and £.642, 8s. 8d. for the proprietors profit rent, which ground rent is now vested in fee in the said Commissioners.

THAT

THAT your Petitioners have engaged two gentlemen of eminence, recommended from the Veterinary College in London, to lecture on and practise the Veterinary art here, not only as to horses, but neat cattle, sheep and swine, who have already begun their lectures; and the Society have purchased a Veterinary museum, for that purpose, from Doctor Percival, of London.

THAT your Petitioners, immediately upon said grant, began the necessary buildings and additions for their drawing schools, for a museum of foreign minerals and another for Irish minerals, for an exhibition-room for Irish artists, and for maintaining at their Botanic garden a full and complete collection of the whole Vegetable system, of which they have already procured a very valuable and extensive assortment, on which Botanic lectures are given, and their practical uses in agriculture, in affording nourishment, and in arts and manufactures, are investigated and explained.

The Society have seen with pleasure and gratitude the sense the Imperial Parliament entertain of these their undertakings, by their having granted £.9000 in the two last Sessions, towards their buildings, and they humbly entreat such further grant as may be necessary for finishing the said several buildings, which
they

they began under the sanction and liberality of the late Parliament of Ireland, the estimate of which is annexed to this Petition.

THAT pursuant to their said Petition they looked out for proper persons to make out Statistical Surveys of the counties ; that several are already undertaken ; and they estimate, that they will cost at the rate of £.80 a county, at an average, exclusive of the expence of printing, both which they state in the annexed estimate.

They beg further to lay before this Honourable House a statement of their permanent engagements, which have been much encreased by the great variety of objects, which they lately embraced for the improvement of agriculture, arts, and manufactures, particularly their procuring lecturers and professors at considerable salaries, and by the additional rents for their Botanic garden, and the grounds necessary for their additional buildings.

THAT these annual charges, if not provided for by the bounty of Parliament, must leave them incapable of encouraging planting, agriculture, and manufactures by premiums and bounties, as they have heretofore done.

THAT, though they claim to themselves some merit in having assisted the agriculture of this kingdom, during a course of many years, they
are

are concerned to state, that it is still very far short of what it might be brought to.

The modes in use are very deficient in making the soil produce what it is equal to, and what the modes practised in Great Britain would do.

THAT their exertions by bounties, and by their repository, and introduction of implements, have brought into use some part of the British practice, and they have no doubt that the improvement and extension of agriculture will keep pace with the amount, to which they shall be enabled to propose encouragement.

THAT this kingdom is peculiarly deficient in timber, and many millions of trees have been planted under their regulations; that there are hundreds of thousands of acres now waste and unprofitable, which by sufficient encouragement might be covered with trees, to the future wealth and aggrandizement of the country, and the support of the British navy, to which the larger the encouragement is that they may be empowered to give, the greater and more speedy will be the benefit.

THAT many manufactures, particularly those in an infant state, require a continuance of their aid to encourage adequate exertion, and they therefore submit to this Honourable House their earnest supplication and hope, that its liberality

berality will please so to increase their annual grant, over and above whatever temporary sum they may in their wisdom think fit to give at present for their buildings, as to support and maintain their several institutions, and hold forth to the public such bounties and premiums for the promotion of agriculture, planting, manufactures, and the fine arts, as may be desirable, an estimate of which for one year, together with the amount of the necessary sums requisite to finish the proper buildings for the several objects aforesaid, they beg leave with all humility to annex.

All which they humbly submit, and entreat such relief as this Honourable House shall in its bounty and wisdom think fit.

In testimony whereof your Petitioners have caused their corporate seal to be hereunto affixed this 18th day of November, one thousand eight hundred and two.

DUBLIN

DUBLIN SOCIETY'S ESTIMATE,

FOR THE YEAR 1802.

Annual Permanent Expenses.

	£.	s.	d.
Salaries, Wages, Rent, &c.	3,429	9	0
Premiums already offered, and for which the Society stand en- gaged.	2,188	0	0
Contingencies, such as stationa- ry, postage, books and periodical publications, coals, candles, plants, repairs, extra workmen, manure, &c. over and above what the So- ciety can apply thereto out of their subscriptions	600	0	0
Rent for the ground, under the recited act of Parliament, as agreed to by the Commissioners of Wide streets.	842	8	8
	7059	17	8
	<i>Estimate</i>		

	£.	s.	d.
Forward,	7059	17	8

*Estimate of temporary engagements of the
Society, for said Year 1802.*

Several persons, whom the Society stand engaged to, for Statistical Surveys of Counties—twenty-seven counties at 80l. per,

2,160	0	0
-------	---	---

Probable expense of printing the same for distribution, twenty-seven counties at 60l. per,

1,620	0	0
-------	---	---

10839	17	8
-------	----	---

Note. Twelve counties of the thirty-two are finished, and paid for.

*Estimate of Arrears due, and Sums necessary to
complete the business.*

Debts due to Tradesmen,	1,833	11	0
To finish business begun,	2,348	16	0
Estimate for rebuilding drawing schools,	1,667	0	0
Estimate for Veterinary buildings	4,048	1	4
Estimate for Gallery over do. for models,	1,145	9	9

11,042	18	1
--------	----	---

C

Estimate

	£.	s.	d.
<i>Forward</i>	11,042	18	1
Estimate for building a wall round the Botanic Garden,	2,984	13	9
	14,027	11	10
And if the aforefaid rent of 642l. 8s. 8d. as stated before shall be purchased for	8,219	1	8
The total sum for buildings and purchase will be	22,446	13	6
To which adding the annual per- manent expences, and estimate of temporary expences, as above.	10,839	17	8
The total sum will be	£.33,086	11	2
Of which sum your Petitioners have received from the late Parliament of Ireland, the sum of £.10,000.			
And from the Imperial Parlia- ment in the last two Sessions, the sum of £.9000—making together the sum of	£.19,000	0	0
Leaving a remainder of	£.14,086	11	2

Your

Your Petitioners moreover beg leave to observe :

THAT in the year 1802, they have been necessitated to exceed the sum allowed by Parliament in the last grant, having been distressed by want of rooms for lecturing and for the exhibition of their models ; many of which are of great value and were perishing in a dark store room, which has obliged your Petitioners to borrow of their Treasurer the sum of £.2000 at interest for one year, to enable them to possess the said apartments unfinished and rough plastered ; they are indebted to their tradesmen and builders in the sum of 4372*l.* 12*s.* 9*d.* and engaged to pay to the Commissioners of wide streets the sum of £.1526, 6*s.* 3*d.* in the two succeeding years ; making together the sum of £.7898, 19*s.*

THAT of the amount of the estimate presented to Parliament in the last Sessions, amounting to the sum of £.33,086, 11*s.* 2*d.*, your Petitioners have received from the late Parliament of Ireland the sum of £.10,000, and from the Imperial Parliament in the last two Sessions the sum of £.9000, making together the sum of £.19,000, reduced by Treasury fees to £.18,430, a reduction which, when added to the great rise in the price of building materials, since this work was begun, militates against one original estimate.

THAT there remains of the aforesaid sum of £.33,086, 11s. 2d. the sum of £.14,086, 11s. 2d. to discharge debts, to complete the buildings, and to pay for the statistical surveys, fifteen of which have been published ; a work they humbly conceive has roused a spirit of enquiry into agriculture and planting, which your Petitioners were anxious to lay hold of, and to improve by pushing forward the work with increasing expedition, and with a view of making the internal state of this country better known to the united kingdom.

Your Petitioners therefore humbly pray the said balance of £.14,086, 11s. 2d. may be granted for the above purposes or such part of it, as in the wisdom of Parliament shall seem meet, in addition to the usual annual grant of £.5,500.

PREMIUMS

1802,



PREMIUMS

OFFERED BY THE

DUBLIN SOCIETY,

FOR

PLANTING AND AGRICULTURE.

THE Society do, in every Premium offered by them, reserve to themselves a discretionary power of withholding the same, if any fraud or intention to evade the public good designs of the Society shall appear; and they will from time to time publish in newspapers all doubtful claims, that may be made to them for premiums, in order to receive objections, and to discover such frauds as may have been practised with respect thereto.

All false affidavits presented before the Society, being punishable in like manner as perjury in other cases;—The Society have appointed a person to examine into their authenticity, and are determined to prosecute all perjuries in the most exemplary manner.

To

To prevent false affidavits, claims will not be allowed unless the magistrates signing the same mention their residence, and where they take the affidavits ; that application may be made by the Society, if any doubt should arise on the validity of the affidavit.

It is expected that all persons, to whom premiums should be adjudged for agriculture and planting, will apply to the Society for the payment of their respective premiums within a year after public notice is given, that the same are in course of payment ; otherwise the said orders will be cancelled by the Society.

All matters, for which the Society offer premiums, must be begun after the publication of such premiums, unless there be a particular exception in the publication.

PLANTING

Premiums.

l. s. d.

P L A N T I N G.

TEN ACRES OR UPWARDS.

Plantations for Timber Trees.

1. A Premium after the rate of four pounds an acre will be given to each person planting between the 1st *August* 1801, and the time of claiming, any quantity of ground, not less than ten acres lying together, or in separate inclosures, each containing not less than one acre, with at least 2000 oak trees, and 2000 of one or more of the following kinds, *viz.* ash, beech, poplar, black cherry, elm, chesnut, larch, fir, or pine, to each and every acre, on proof being made before the Society, that the said ground is sufficiently fenced against cattle.—The nature of the fence and preparation of the ground must be fully stated in the claim; and security will be required in the sum of £.100 by bond, that the said fence shall be preserved in good order, and that

the

Premiums.

l. s. d.

“ whereof
 “ not less than two thousand oaks, and
 “ two thousand other trees of said de-
 “ nominations are planted on each and
 “ every acre of said acres,
 “ and that the said ground is sufficient-
 “ ly fenced against cattle, being fenced
 “ in the following manner, (*here insert*
 “ *the nature of the fence, or fences*) that
 “ the said ground is of a
 “ soil, and was prepared previous
 “ to planting said trees by
 “ (*stating how.*)”

The claims for this premium to be made on or before the first of *May* 1803, and to be taken into consideration on the last *Thursday* in the said month.

Planting Oak, or Larch.

2. A premium of three pounds per acre will be given to each person, who shall plant between the first of *October* 1801, and the first of *May* 1803, any quantity of ground not less than one plantation acre, for which he shall not be entitled to, or shall not claim the foregoing premium, with three thousand

Premiums.

l. s. d.

land oak trees (not less than one, nor more than five years old) or with 8000 larch trees, (not less than one nor more than four years old) at the least to each acre, on proof being made before the Society, that the said ground is sufficiently fenced against cattle.--The nature of the fence and preparation of the ground must be fully stated in the claim, and security will be required in a sum after the rate of twenty pounds for each acre, or £.100 in the whole, that the said fence shall be preserved in good order, and the number of trees shall be preserved or replaced, so as to keep up 2000 oak, or 6000 larch, respectively on each acre for ten years; and that proof shall be made to the Society by affidavit in each and every of the said ten years, some time in each month of *May* or *June*, that the said fence is preserved and in good order, and that 2000 oaks at the least, or 6000 larch at the least, are growing on each acre thereof, and well preserved.

For this premium for oak the sum of £.100 will be appropriated, and for the premium for larch the sum of

£.150:

Premiums.

l. s. d.

£.150 : and as the object of the Society, in the offer of this premium for the planting of oak, is partly with a view of producing a quantity of oak bark at a future period, it may be a further encouragement to the planter, to observe, that from the best information on the subject it is well known, that oak bark is never in greater perfection than on trees between twenty and thirty years growth ; and that the thinning of oak woods at sixteen years standing produces a very valuable return both by bark and poles, and that such poles are particularly well calculated for hop-grounds. - - - - - 250 0 0

The claims are to be sent in, and adjudged at the same times respectively as the preceding premiums, and if the quantity of oak or larch required be planted on each acre, the claimant will not be barred by the plantation being thickened with as many other trees as he chooses. On the contrary, it is recommended to plant many trees among them for shelter, and the planter is advised, first to plant the ground with the oak or larch at equal distances, and then

Premiums.

l. s. d.

then to fill up the interstices with other trees, which will produce a considerable profit, when the growth of the oak or larch shall require their being cut down.

Planting Sweet Chesnuts.

3. A premium of £.3 per acre will be given to each person, who shall plant between the first of *August* 1801, and the first of *May* 1803, any quantity of ground not less than one plantation acre, for which he shall not be entitled to, or shall not claim either of the foregoing premiums, with four thousand sweet chesnut trees (not less than one nor more than five years old) at the least to each acre, on proof being made before the Society, that the said ground is sufficiently fenced against cattle.— The nature of the fence and preparation of the ground must be fully stated in the claim, and security will be required in a sum after the rate of £.10 for each acre, with like conditions as for the preceding premiums, and the claims

Premiums.

l. s. d.

claims to be made and adjudged at the same times respectively.

For this premium the sum of 1.102 will be appropriated. - - 102 0 0

Planting by Contract.

4. Three premiums of 1.100 each will be given to the three persons, who shall plant the greatest quantity of ground, not less than forty acres, by contract : and three more of fifty pounds each, to the three persons, who shall plant the next greatest quantity of ground, not less than twenty acres, in like manner, between the first of Oct. 1802, and the first of May 1803, in manner following :

The claimant is to enter into a written contract with some nursery-man, who keeps a nursery for sale, that such nursery-man shall furnish and plant in each acre 8000 trees at the least, and replace all that die, or may be injured, for three years at the least, so as to leave, at the end of the third year, 8000 good growing trees on each acre :—Sallow, poplar, birch, and horse chesnut, are not

Premiums.

l. s. d.

not included;—and there must be at least 3000 oak, or 3000 larch among the number contracted for, in each acre.

A copy of the contract, and of the security of its performance, is to be delivered with the claim, which must be made before the 10th day of *May* 1803, and will be taken into consideration on the last *Thursday* of the said month.

The person receiving the premium must give security in the sum of £.100, that a sufficient fence shall be preserved round such plantation for ten years; that the number of 6000 trees, at least, shall be preserved or replaced on each acre thereof, during said ten years, so as always to have 6000 growing trees on each acre, 3000 whereof shall be larch or oak, and that proof shall be made thereof to the Society by affidavit, in every month of *May* or *June*.

All contracts, where it shall appear that not more than 8l. per acre is to be paid for the entire expence, exclusive of fencing and draining, will have a preference in the claim.

The

The Society judging it expedient, that the foregoing premiums for the two years should be consolidated together, so as to allow ground to be fenced and prepared, and trees procured for the purpose, have deferred the time of claiming to *May* 1803, and they propose to continue them for three years, if enabled by parliament.

To the claimant, who shall have planted the greatest quantity, and in the best manner, a medal will be given together with the premium.

450 0 0

Saving Larch and Scotch Fir seed.

As the Society have reason to believe, that the cones of larch and Scotch fir, growing in Ireland, contain as good seed as any imported, and generally in a sounder state.

A premium of 3s. will be given for every 1000 Scotch fir or larch seedlings, which shall be reared from Irish seed, sown between 1st *January*, 1802, and 1st *May*, 1803.

The claim to be made on or before the 1st day of *May* 1803, setting forth that the said larch has been transplanted that spring, the number so transplanted

Premiums.

l. s. d.

planted, and the manner, in which the seed was extracted from the cones.

For this premium the sum of 120*l.* will be appropriated, and if there should be claimants to a greater amount, the said sum will be ratably divided. Should nursery-men claim for seedlings sold, a certificate from the buyers of their being healthy well grown plants, and properly planted, or transplanted, must be delivered with the claim.

120 0 0



PLANTING

P L A N T I N G,

RECAPITULATED.

	£.
1. Planting 10 acres or more,	400
2. Oaks, and larch,	150
3. Sweet chefnuts,	102
4. By contract,	450
5. Raifing larch and Scotch fir, from Irish feed.	120
	1322

Whereas the fums offered for planting amount to 1322l. if there fhall not be claimants for the whole amount, in each refpective clafs, the Society referve to themfelves the power of appropriating the furplus, to make up the deficiency, that fhall arife in any of the foregoing claffes, according to their refpective merits.

Premiums.

l. s. d.

*Answering at Public Examinations in Botany.**Second year.*

1. To the person, who shall at a public examination to be held at some time in the course of the year 1803 (to be appointed by the Committee of Agriculture, and of which due notice will be given) answer best in Botany at large, the sum of 50l. and a gold medal 50 0 0

To the second best, the sum of 30l. and a silver medal. - - - 30 0 0

To the third best, the sum of 20l. 20 0 0

To the person, who shall at a like examination answer best on the several sorts of vegetables, nutritive or detrimental to each species of cattle, with their several qualities, Botanic descriptions, soils in which they thrive best, &c. the sum of 50l. and a gold medal. 50 0 0

To the second best, the sum of 30l. and a silver medal. 30 0 0

To the third best, the sum of 20l. 20 0 0

To the person, who shall answer best at a like examination, on the several sorts of hay-grasses, their qualities,
Botanic

Premiums.

l. s. d.

Botanic descriptions, and soils in which they thrive best, &c. the sum of 20l.

To the second best, the sum of 10l. 30 0 0

230 0 0

The foregoing premiums at examination being intended to promote a useful spirit of acquiring a scientific knowledge of grasses and all other vegetables among persons, who either are or hereafter mean to be practically engaged in farming; no person will be entitled to any of them, who is not a farmer, son, or apprentice of a farmer, or a working man, or who does not satisfy the Society, that he means to go to service or practise in the farming line. All other persons will be admitted to be examined, and on examination will be entitled according to their respective merits to a gold or silver medal, but not to preclude by superior answering any of the foregoing premiums or medals from being adjudged to the description of persons, whom they are intended for.

These premiums will be continued for three years successively; and the

Premiums.

l. s. d.

Society reserve a power of withhold-
them, where a want of merit shall ap-
pear in the claimant's examination.

*Producing Native Plants not hitherto de-
scribed, &c.*

2. To any person, who shall in the
year 1803, produce to the Society any
plant, either tree, shrub, or herb, so far
peculiar to *Ireland*, as that it is a native,
and is not described in any work of
Linnaeus or the later Botanists, the sum
of five guineas.

For this premium the sum of twen-
ty guineas will be appropriated.

22 15 0

Establishing a Veterinary School.

To assist the farmer in preserving the
health of his labouring cattle and stock,
by promoting the study of the diseases
of cattle, and their cure; the Society
have begun the establishment of a Ve-
terinary school, where, as well the
diseases of horned cattle, sheep and
swine, as of horses, shall be scientific-
ly

ly taught, their causes explained, and their cures pointed out; they mean to fix it in *Hawkins's-street*, so soon as their intended buildings there will allow room for the purpose; and they have engaged Surgeon Peall and Mr. Watts as professors, who have already begun the lectures, and commenced the practical part of the business.

Procuring Grass Seeds.

3. For all feeds of the following grasses, which shall be gathered and delivered at the Botanic Garden, before the 1st of *January* 1803, clear and free from all dirt or mixture of other seeds, viz.—*Poa trivialis*, or rough stalked meadow grass :—*Poa pratensis*, or smooth stalked meadow grass :—*Poa annua*, or annual meadow grass :—*Dactylis glomerata*, or rough cock's-foot grass :—*Festuca ovina*, or sheep's fescue grass :—*Festuca pratensis*, or meadow fescue grass :—*Avena flavescens*, or yellow oat grass :—*Avena elatior*,

Premiums.

l. s. d.

tior, or tall oat grass :—*Alopecurus pratensis*, or meadow fox-tail grass :—
—and *Anthoxanthum odoratum*, or sweet scented meadow grass, a premium of 8s. a bushel will be given for the first 100 bushels.

Specimens of the grasses and seeds, and directions for gathering them, will be given at the Botanic Garden to those who enquire : they are all natives of this kingdom, and to be found in a greater or less proportion in almost every meadow.

40 0 0

The *alopecurus pratensis* is the earliest of the common meadow grasses, and furnishes the greatest quantity of hay.

The *anthoxanthum odoratum* is the grass, which gives the sweet scent to the hay, so well known to those, who have examined the generality of hay in England, and ought to be cultivated in every meadow.

The Society propose to distribute these grass seeds at the prices paid for them, and recommend the sowing a part of them in small plots of well prepared

pared ground, for the purpose of increasing the seed, and keeping the supply of it always pure.

✎ All claimants for the foregoing premiums for agriculture, are to swear their affidavits before a magistrate in their neighbourhood : and they are to set forth in their claims the county, barony, and parish, where the work was done, and likewise the next post town to said magistrate.

*Answering at Public Examination in
Mineralogy.*

4. The sum of one hundred guineas will be given to the three persons, who upon examination shall be found to answer best on the subject of mineralogy : The said sum to be divided in the following manner, viz.—Fifty guineas to him, who shall be deemed to answer best.—Thirty guineas to the person, who shall answer next best ;—and twenty guineas to him, whose knowledge shall appear to approach
nearest

Premiums.

l. s. d.

nearest to the two former. The examination to be held publicly on the 3d day of *November*, 1802, by *Richard Kirwan*, Esq. or by whomever he shall appoint.

A like examination, and like premiums, and also on 3d Nov. 1803.

A candidate for a premium, or a person applying for a bounty, being detected in any disingenuous methods to impose upon the Society, shall forfeit all such premium, or bounty, and be incapable of obtaining any for the future; and if any person shall be detected in offering any forged instrument in evidence to the Society, or in committing wilful perjury in proof of any claim, a prosecution will be carried on against such offender with the utmost rigour of the law.

The Society, being desirous of avoiding as much as possible the multiplication of oaths in the disposal of their premiums,

premiums, request, that the nobility, magistrates, gentry, and clergy, in their several districts, will give their attention, when applied to for certificates of the merits of any candidate for a premium, to examine the pretensions of such persons.—It is an object to every honest farmer to detect frauds and imposition; the Society's funds being limited, of course all premiums paid to fraudulent claimants are deductions from the honest and industrious farmer.

The different claimants are to notify to the Assistant Secretaries their address; that the Society may know where to apply to them, if they should have occasion so to do.

In all claims where the acre is mentioned, the Society intend plantation measure of 7 yards to the rod or pole, which must be set forth in the claim.

All claims are to be sent to the Secretary at his office in the Society house, Hawkins's-street.

AGRICULTURE,

Premiums.

l. s. d.

AGRICULTURE,

RECAPITULATED.

	£.	s.
1. Answering at examinations in Botany,	230	0
2. Producing native plants, &c. not hitherto described,	22	15
3. Procuring grass seeds,	40	0
4. Answering examination in mineralogy,	113	15
	£.406	10

FINE

FINE ARTS.

GENERAL PREMIUMS.

For the best drawing in perspective of the College and Parliament House, including the new buildings, not less than 18 and 22 inches, taken from the north street leading to Carlisle bridge. 11 7 6

To be produced on or before the first *Thursday* in *May* 1803.

Engraving on Wood.

For the best engraving on wood, for illustrating works in arts or sciences, or for decorating books, and capable of being worked with the letter press. 5 13 9

The engraving and two or more impressions from it, to be produced to the Society on or before the first *Thursday* in *May* 1803.

Engraving.

For artists in general, and students of the Society's academy.

For

Premiums.

l. s. d.

For the best engraving of a landscape with figures, from a picture, of which there is no print, not less than 16 inches by 12.

11 7 6

For the next best.

5 13 9

For the next best landscape in aqua-tinta.

5 13 9

For the next best. a silver medal.

To be produced with the plates on or before the first *Thursday* in *May* 1803.

Etchings.

For the best etchings of human figures, copied from any prints or drawings, not less than 9 inches by 6, by a youth under the age of 21.

3 8 3

For the next best. a silver medal.

The above to be produced with the plates, on or before the first *Thursday* in *May*, 1803, and three impressions from each of them, for the use of the Society.

Models

Premiums.

l. s. d.

Models in Clay.

For the best models in clay of an entire figure or figures, not less than 15 inches high.

3 8 3

For the best basso relievo in clay, for an entablature of a chimney piece.

a silver medal gilt.

To be produced on or before the first *Thursday* in *March* 1803.

Drawing.

For the best drawings in chalk of a human figure after the life, done at the Society's Academy, not less than 16 inches high, by youths under the age of 21, to be produced on or before the last *Thursday* in *March* 1803, and determined in proportion to their merits.

5 13 9

Landscape.

For the best drawings of landscapes after nature, begun and finished on the spot, to be made with chalk, pen, Indian ink,

Premiums.

l. s. d.

ink, or bister, by youths under 21 years of age, to be determined in proportion to their merits, to be produced on the same day.

5 13 9

Still Life.

For the best drawings of beasts, birds, dead game, or still life, after nature, by youths under 20 years of age, to be determined in proportion to their merits, to be produced on the same day.

5 13 9

N. B. Scholars are not excluded from the foregoing premiums.

DRAWING SCHOOLS.

PREMIUMS FOR SCHOLARS.

Fourteen silver medals will be annually given for the encouragement of the students in the several drawing-schools

schools belonging to the Dublin Society : viz.

School for Figure-drawing.

1st Class.—For a group of figures, not less than three, of thirteen inches long, from nature.

For a single academy figure from nature.

2d Class.—For drawing from the round.

For second ditto from the round.

3d Class.—For ditto from the flat.

For second ditto from the flat.

The several candidates in each of the above classes to produce their drawings all from the same model and the same attitude, and also to copy from the same drawing in the flat.

School for Landscape and Ornament-drawing.

Landscape.

1st Class.—For the best drawings of trees from La Porte, not fewer than
two

Premiums.

l. s. d.

two trees, the size of the originals, to be shaded with Indian ink.

2d Class.—Ditto.

Ornaments.

1st Class.—For the best ornament on a whole sheet of drawing paper, shaded with Indian ink.

2d Class.—Ditto in chalks.

School for Architecture.

1st Class.—For the best drawing of the Doric and Ionic orders complete, not less than two feet high, and shaded in Indian ink.

A second ditto.

2d Class.—For the best drawing after Malton's perspective of the Parliament House, of the size of the original, to be shaded in Indian ink. A silver medal and one guinea.

A second ditto, a silver medal.

Every

Premiums.

l. s. d.

Every claimant, whether for figure, landscape, ornament, or architecture, must produce drawings from the same designs, and shall not be permitted to produce any other drawings.

Every drawing must be done under the inspection of the master.

No student shall be a candidate for more than one medal in the same year.

The above medals to be adjudged on the first *Thursday* after the 25th day of *March* in each year.

The sum of sixty guineas will be appropriated, for the purposes of procuring living models for the students to draw from ; to defray all contingent expences attending the same, and the etching room ; and to provide the medals before mentioned, for one year.

* * All matters, for which the Society offer premiums, must be begun after the publication of such premiums, unless there be a particular exception in the publication.

The Society reserve to themselves a power of giving in all cases such part only of any premium as the performance

E

mance

Premiums.

l. s. d.

mance shall be adjudged to deserve; or, in case of want of merit, no part.

No person will be admitted a candidate for any premium offered by the Society, who has obtained a patent for the exclusive right of making or performing any thing, for which such premium is offered, or for which premium there might not have been a fair competition.

All claims for premiums are to be lodged with the Assistant-secretaries, at the latest the evening before they are to come on.

No premium of the Society, where the claim is to be supported by affidavit or certificate, shall be adjudged to any claimant, who shall not have lodged with the Assistant-secretaries, at their office at the Society's Repository in *Hawkins'-street*, such affidavit or certificate at least eight days before the day appointed for the adjudication, as fixed in the printed list of premiums.

In every case, where an affidavit is required by the Society, the solemn affirmation of a known quaker will be admitted.

It

It is required, that all claims shall be strictly conformable to the conditions set forth in the list of premiums, otherwise they will be rejected.

Where claimants are marksmen, the magistrates signing such claims must certify, that the same were truly read to the Deponent.

All premiums, offered by the *Dublin Society*, are designed for *Ireland* only.

* * * The *Dublin Society*, being desirous of promoting such enquiries as may tend to the information and service of the public, and also of diffusing, as generally as possible, the knowledge of such useful discoveries as may be communicated, as well as those, which are locally known and practised, request the assistance and communication of the ingenious and experienced.

By Order of the Society,

THOMAS LYSTER, }
FIELDING LYSTER, } *Assist. Sec.*

N. B. Abstracts of the different Acts of Parliament for the preservation of trees and shrubs, may be had on application at the Repository in *Hawkins'-street*, or at Mrs. *Sleater's*, 28, *Dame-street*.

“ BOARD OF AGRICULTURE,
“ *Sackville-street, June 11, 1802.*

“ SIR,

“ IN obedience to an Order of the *Board of*
“ *Agriculture*, I beg to transmit to you, as one
“ of the Honorary Members of the Board, a
“ copy of certain Agricultural experiments
“ recommended for trial. They are proposed
“ to your consideration, in the hope that some
“ one or more of these experiments may suit
“ the nature of your soil, and may not prove
“ too troublesome in the execution.”

“ I have the honour to be,

“ Sir, your most obedient Servant,

“ ARTHUR YOUNG,
Secretary.”

To Lieut. Gen. Vallancey.

“ BOARD

“ BOARD OF AGRICULTURE.

GENERAL COMMITTEE.

“ *Thursday, May 27, 1802.*

“ PRESENT :

“ *Lord CARRINGTON, President,*

“ <i>The President of the Royal</i>	“ <i>Sir Henry Fletcher, Bart.</i>
“ <i>Society,</i>	“ <i>Sir Rob. W. Vaughan, Bart.</i>
“ <i>The Surveyor-General of</i>	“ <i>Sir George O. Paul, Bart.</i>
“ <i>Crown-lands,</i>	“ <i>Sir Cecil Wray, Bart.</i>
“ <i>The Earl of Moira,</i>	“ <i>Richard Ellison, Esq.</i>
“ <i>Lord Viscount Wentworth,</i>	“ <i>L. Millington, Esq.</i>
“ <i>Lord Sheffield,</i>	“ <i>Tho. Estcourt, Esq.</i>
“ <i>Right Hon. John Foster,</i>	“ <i>Rev. H. Bate Dudley.</i>
“ <i>Sir Chris. Willoughby, Bart.</i>	

“ Took into consideration the reference to
“ the committee to consider, whether any ex-
“ periments in agriculture should be recom-
“ mended for trial to the Members of the
“ Board ; particularly on feeding sheep ; on
“ the quantity of seed-corn ; on paring and
“ burning ;

“ burning ; and on feeding horses—when the
“ following were proposed, and adopted.”

No. I.

“ Experiments to determine the compara-
“ tive difference in the weight, that can be pro-
“ duced on sheep, by feeding them with dif-
“ ferent sorts of artificial winter food, under
“ various modes of management.”

*“ Experiment on feeding Sheep with Swedish
Turnips.”*

“ Twenty sheep of the same age, and of
“ nearly the same weight and condition, shall
“ be selected out of the same flock, which shall
“ have fed together for the preceding twelve
“ calendar months, or more. Five of them
“ shall be put into a covered building, well sup-
“ plied with good water : five more of them
“ shall be put into a straw-yard, with some sort
“ of shelter to retire to at will, and well sup-
“ plied with water : five more shall be put
“ into a small paddock, or field, bare of grass :
“ the other five shall be folded on the land
“ where the Swedish turnips shall grow.”

“ The

“ The four lots of sheep shall be all fed together upon Swedish turnips, from the middle of October, 1802, till the first week in November, 1802, or until they are well reconciled to the food. The lots shall be then divided ; each lot weighed, and put up for trial of the experiment ; and shall be fed with an equal quantity of Swedish turnip, twice or thrice every day, and also with an equal quantity of hay or straw, or both cut into chaff, from the same stacks ; and shall continue to be so fed, till the first week in February 1803. They shall be again weighed the first week in every month, during the course of the experiment, and an accurate account taken of the weight of each lot at each time of weighing : they shall also be weighed at the close of the experiment. They shall always be housed and fasted the night before the weighing takes place ; which shall be deferred until a drier day, if, owing to fog or rain, the fleeces of those, that lie out in the open air, shall be wet.”

“ The same experiment to be tried, by feeding with cabbages, or any other artificial food, provided for winter consumption : but every different sort of food shall be considered as a different experiment.”

“ A note

“ A note to be made of the sort of sheep ;
“ the separate weight of each lot of sheep, at
“ each time of weighing ; and the sort and
“ weight of food given to each lot of sheep
“ daily, during the course of the experi-
“ ment.”

“ A Return to be made to the *President*, of
“ the result of each experiment, on or before
“ the first day of April, 1803, by the Member
“ making it ; together with any observations
“ he may think necessary to explain the same.”

No. II.

“ Experiments to determine the proper
“ quantity of seed per acre required on land
“ cropped with corn, on a due consideration of
“ the nature and quality of the soil, and of the
“ value of the land.”

“ *Experiment on Wheat.*”

“ One square perch of land to be dibbled
“ with wheat, at the distance of four inches
“ every way.”

“ One

“ One other square perch of land to be dib-
“ bled with wheat, at four inches distance in
“ the rows, and the rows to be eight inches
“ distance from each other.”

“ One other square perch of land to be dib-
“ bled with wheat, at four inches distance in
“ the rows, and the rows to be twelve inches
“ distance from each other.”

“ The above land to be all dibbled with two
“ grains of wheat in each hole.”

“ Three other perches of land to be dibbled
“ with wheat, at the same distances as the
“ above, with three grains of wheat in each
“ hole.”

“ Three other perches, with four grains of
“ wheat in each hole.”

“ Three other perches of land to be dibbled
“ with two grains in each hole ; and in the
“ spring, if in these three perches both seeds
“ vegetate, one plant shall be drawn, so as to
“ leave only one plant in each hole.”

“ The whole to be dibbled at the same time,
“ which shall not be later than the last day of
“ November, 1802, at the depth of one inch
“ and a half, as nearly as may be.”

“ *Experiment*

“ Experiment on Barley.”

“ The same number of perches to be dibbled
“ with barley, in the same manner as the
“ wheat, before the last day of April, 1803.”

“ Experiment on Oats.”

“ The same number of perches to be dib-
“ bled with oats, in the same manner as the
“ wheat, before the last day of March, 1803.”

“ The whole of each experiment to be made
“ on land as equal in its quality as possible : to
“ be kept free from weeds, and to be treated
“ exactly alike, during its growth, harvesting,
“ &c.”

“ A note to be made of the separate weight
“ and measure of the grain, and weight of the
“ straw of each perch of land ; the sort of corn ;
“ nature, quality, preparation, and annual va-
“ lue, of the land ; and the quantity and sort
“ of manure, if any, used to each perch.”

No.

No. III.

“ Experiment to determine the proper depth,
 “ to which land should be pared and burned,
 “ on such soils as may be fit for the opera-
 “ tion..”

inch.

“ Two perches of land to be pared and		
“ burned, to the depth of		$0\frac{1}{2}$
“ Two ditto	ditto	1
“ Two ditto	ditto	$1\frac{1}{2}$
“ Two ditto	ditto	2
“ Two ditto	ditto	3
“ Two ditto	ditto	5

“ Let each of these perches of land, after the
 “ ashes have been turned down with a spade,
 “ to the depth of five inches, and the land has
 “ been made as fine as it conveniently can, be
 “ sown at the proper season with turnip-feed.
 “ The plants shall be twice well hoed, and set
 “ out at twelve inches distance from each
 “ other. The produce shall be weighed in the
 “ first week in November, 1803; noting the
 “ sort of land, on which the experiment has
 “ been tried.”

No.

No. IV.

“ Feeding Horses.”

“ The Board wishing to ascertain the cheapest method of feeding horses, so as to preserve them in health and vigour, recommend the following experiments :

“ To compare the common method of feeding, by means of oats and hay, with that by Swedish turnips, potatoes, carrots, parsnips, or other roots, raw or steamed, and given with the liquor mixed with cut straw, cut hay, chaff, &c.

“ The Board requests, that the Reports should contain the particular quantities of each article consumed, and the expense of each, including labour, fuel, &c. and the effect of the different species of food on the condition and power of the horses.”

“ The Report of these experiments, to be made from time to time to the *President*, in Sackville-street.

PREMIUMS

PREMIUMS

OFFERED BY

THE BOARD OF AGRICULTURE,

FOR 1802.



No. I. *Shoes for the Poor.*—To the person, who shall invent, and execute in a manner applicable to common use, the best and cheapest substitute for leather, in the shoes of the labouring poor, being an improvement on any that may at present be in use.—*the gold medal.*

A pair of shoes, with an account of the materials and expense, to be produced on or before the first Tuesday in December, 1802.

No. II. *Culture of Plants.*—To the persons, who shall make the most satisfactory experiments

ments tending to the improvement of the culture of each of the following plants respectively, viz. wheat, rye, barley, oats, pease, beans, tares, buck-wheat, turnips, cabbages, rutabaga, potatoes, carrots, parsnips, clover, lucerne, sainfoin, chicory, hemp, flax, hops—*the silver medal.*

Accounts, verified by certificates, to be produced on or before the second Tuesday in May, 1803.

The same premium for 1804.

The same premium for 1805.

No. III. *Draining*.—To the person, who shall lay before the Board the most satisfactory account of one of Mr. Elkington's drainages—*the silver medal.*

The soil and state of the land before draining, the method and expense of the improvement, with a plan, and the result of the operation, to be produced on or before the second Tuesday in December, 1802.

No. IV. *Folding Sheep*.—To the person, who shall, by a series of the most satisfactory experiments, ascertain the comparative advantages and disadvantages, and best method, of folding sheep—*the gold medal.*

Accounts, verified by certificates, to be produced on or before the first Tuesday in April, 1803.

The

The same premium for 1804.

The same premium for 1805.

No. V. *Horses and Oxen*.—To the person, who shall make, and report to the Board, the most satisfactory experiments on the comparison of horses and oxen, in the general business of a farm—*the gold medal*.

The account, verified by certificates, to be produced on or before the last Tuesday in April, 1803.

The same premium for 1804.

The same premium for 1805.

No. VI. *Green Crops for Manure*.—To the person, who shall give the most satisfactory account, verified by experiments, of the effect of ploughing in green crops for manure—*the gold medal*.

Accounts, with certificates, to be produced on or before the first Tuesday in March, 1803.

No. VII. *Manures*.—To the person, who shall lay before the Board the most satisfactory account, verified by chymical experiments, or other sufficient authorities, of the nature of manures, and their effect on the principles of vegetation—*the gold medal*.

To be produced on or before the first Tuesday in December, 1802.

No.

No. VIII. *Manures*.—To the person, who shall lay before the Board the most satisfactory account of the application and effect of manures, verified by practical experiments on not less than one acre for each sort of manure—the *gold medal*.

To be produced on or before the first Tuesday in December, 1802.

The same premium for 1803.

The same premium for 1804.

No. IX. *Salt*.—To the person, who shall report to the Board the most satisfactory experiments, to ascertain the advantages or disadvantages, which have attended the use of salt as a manure, either simple, or mixed with other substances, and also for assisting in the food of animals—the *gold medal*.

It is required, that the accounts of it, as a manure, shall contain a description of the soils, on which the experiments are made; the other manures, which may previously have been used on the land; the quantities of salt, mixed or unmixed, applied, and the effect carefully ascertained: and the quantity given, and in what manner, to any sort of live stock.

To be produced to the Board, on or before the first Tuesday in December, 1803.

No. X. *Plough*.—To the person, who shall produce to the Board the plough, which shall, with the least force, turn a furrow not less than six inches deep, and nine broad, in the best and neatest manner—*the gold medal*.

To be produced on or before the first Tuesday in February, 1803.

The plough, which gains the premium, to remain the property of the Board, the price of it being paid.

No. XI. *Carts*.—To the person, who shall produce to the Board the cart, or other carriage, applicable to common use, in bad, as well as good roads, in which one horse shall draw the greatest weight—*the gold medal*.

To be produced on or before the first Tuesday in February, 1803.

The cart, which gains the premium, to remain the property of the Board, the price being paid.

No. XII, *Laying down to Grass*.—To the person, who shall, in the most satisfactory manner, make the following experiment in laying down land to grass, on a scale of not less than three acres to each division, and report the result to the Board—*the gold medal*.

The land to be divided into three parts—
one sown with grass seeds, among barley
or oats, in the spring, on land that was
fallowed,

fallowed, or yielded turnips the preceding year ; one sown with grafs-seeds alone, in July or August, having been fallowed from the Michaelmas preceding ; and the third sown with grafs-seeds and wheat, early in September, having been fallowed, or cropped with tares or turnips ; the soil to be of the same quality ; the grafs-seeds the same in each division. The grafs to be fed with sheep the first year. Accounts, stating the comparative expenses and success of the three methods, verified by certificates, to be produced to the Board, on or before the first Tuesday in December, 1803.

The same premium for 1804.

No. XIII. *Seed-Wheat*.—To the person, who shall, by the most satisfactory experiments, ascertain the proper quantity of seed-wheat to be used per acre, in the common or broad-cast husbandry ; not less than one acre to be applied to each quantity of seed—*the gold medal*.

Accounts, containing a particular description of the soil, and the preparation thereof, including the manuring, if any ; also the time of sowing, the various quantities of seed employed ; with the respective products, verified by certificates, to be produced to the Board, on or be-

fore the first Tuesday in December, 1802.

The same premium for 1803.

No. XIV. *Seed-Wheat*.—The same premium as in the preceding number, and on the same conditions, to be given for ascertaining the proper quantity of feed-wheat dibbled on a clover, or other lay.

No. XV. *Seed-Barley*.—To the person, who shall, by the most satisfactory and comparative experiments, ascertain the proper quantity of feed-barley to be used per acre, in the common, or broad-cast husbandry ; not less than one acre to be applied to each quantity of seed —*the gold medal*.

Accounts, containing a particular description of the soil, and the preparation thereof, including the manuring, if any ; also the time of sowing, the various quantities of seed employed ; with the respective products, verified by certificates, to be produced to the Board, on or before the first Tuesday in December, 1802.

No. XVI. *Seed-Oats*.—The same premium, and on the same conditions, to be given, for ascertaining the proper quantity of feed-oats.

No. XVII. *Seed-Oats*.—The same premium, and on the same conditions as in the preceding number,

number, to be given, for ascertaining the proper quantity of seed-oats dibbled on a lay, or on old pasture-ground.

GENERAL CONDITIONS.

1. The Board reserves to itself the power of with-holding any premium, when the communication or communications are not deemed sufficiently important to merit the reward.
2. The MSS. &c. sent in claim of premiums, to remain the property of the Board.
3. All Memoirs, &c. sent in claim of premiums, to be without the name of the author, or any intimation to whom they belong; but with a mark or number, and accompanied by a sealed letter (on which is to be written the same mark or number), containing the name and address of the claimant, and the certificates; which sealed letter will not be opened, unless the premium be adjudged to the MSS. bearing that mark or number.—Without the attention of the writer to this circumstance, the Board cannot vote any reward to such MSS.

The

The writer is requested to send some person to inquire the determination of the Board, within twelve months after the MS. is delivered.

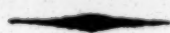
In case of no application, the letter, containing the name and address of the claimant, will be burned.

LONDON

LONDON SOCIETY.



PREMIUMS *offered by the SOCIETY, instituted at
London, for the Encouragement of Arts, Manu-
factures, and Commerce, for the Year 1802.*



TO THE PUBLIC.

THE chief objects of the Society are to promote the arts, manufactures, and commerce of this kingdom, by giving rewards for all such useful inventions, discoveries, and improvements, (though not mentioned in this book) as tend to that purpose; and, in pursuance of this plan, the Society have already expended near fifty thousand pounds, advanced by voluntary subscriptions of their members, and legacies bequeathed.

The

The manner, in which this money has been distributed, may be seen by applying to the Secretary or other officers of the Society, at their house in the *Adelphi*. The Register of the premiums and bounties they have given will shew the very great advantages, which the public have derived from this Institution.

The meetings of the Society are held every *Wednesday*, at seven o'clock in the evening, from the fourth *Wednesday* in *October* to the first *Wednesday* in *June*. The several Committees meet on other evenings in the week during the session.

In order still farther to promote the laudable views of this Society, it may be necessary to explain the mode, by which its members continue to be elected.

Each member has the privilege, at any weekly meeting of the Society, of proposing any person, who is desirous to become a member, provided such proposal is signed by three members of the Society.

Peers of the Realm or Lords of Parliament are, on their being proposed, immediately ballotted for ; and the name, with the addition and place of abode, of every other person proposing to become a member, is to be delivered to the Secretary, who is to read the same, and properly insert the name in a list, which is to be hung

hung up in the Society's room until the next meeting; at which time such person shall be ballotted for; and, if two-thirds of the members, then voting, ballot in his favour, he shall be deemed a *perpetual member*, upon payment of *twenty guineas* at one payment; or a *subscribing member*, upon payment of any sum not less than *two guineas* annually.

Every member is entitled to vote, and be concerned in all the transactions of the Society, and to attend and vote at the several Committees. He has also the privilege of recommending two persons as auditors, at the weekly meeting of the Society; and, by addressing a note to the housekeeper, of introducing his friends to examine the various models, machines, and productions, in different branches of arts, manufactures, and commerce, for which rewards have been bestowed; and to inspect the magnificent series of moral and historical paintings so happily contrived and completed by *James Barry, Esq.* which, with some valuable busts and statues, decorate the great room. He has likewise the use of a valuable library, and is entitled to the annual volume of the Society's Transactions.

The time appointed for admission to the paintings or models, is from ten to two o'clock, *Sundays* and *Wednesdays* excepted.

PREMIUMS

PREMIUMS IN AGRICULTURE.

1. *Ascertaining the best method of raising Oaks.*— To the person, who shall ascertain in the best manner, by actual experiments, the comparative merits of the different modes of raising oaks for timber, either from acorns set on land of the foregoing description properly dug or tilled, from acorns set by the spade or dibble, without digging or tillage, either on a smooth surface, or among bushes, fern, or other cover ; or from young plants previously raised in nurseries, and transplanted ; regard being had to the expense, growth, and other respective advantages of the several methods ; the gold medal. The *accounts* and proper *certificates*, that not less than one acre has been cultivated in each mode, to be produced to the Society on or before the first Tuesday in November 1802.

2. The same premium is extended one year farther. The *accounts* and *certificates* to be produced on or before the first Tuesday in November, 1803.

3. *Securing Plantations of Timber-Trees, and Hedge-Rows.* To the person, who shall give to the Society the most satisfactory account, founded
ed

ed on experience, of the most effectual and least expensive method of securing young plantations of timber-trees, and hedge-rows, from hares and rabbits, as well as sheep and larger cattle, which at the same time shall be least subject to the depredations of wood-stealers, the silver medal, or twenty guineas. The *accounts* and *certificates* of the efficacy of the method to be produced to the Society on or before the first Tuesday in November, 1802.

4. The same premium is extended one year farther. The *accounts* and *certificates* to be produced on or before the first Tuesday in November, 1803.

5. *Preventing the Blight, or ravages of Insects, on Fruit-trees and Culinary Plants.* To the person, who shall discover to the Society the most effectual method of preventing the blight, or ravages of insects, on fruit-trees and culinary plants, superior to any hitherto known or practised, and verified by actual and comparative experiments; the gold medal, or thirty guineas. The *accounts*, with proper certificates, to be delivered to the Society on or before the second Tuesday in November, 1802.

6. The same premium is extended one year farther. The *accounts* and *certificates* to be delivered on or before the second Tuesday in November, 1803.

7. *Removing*

✓

7. *Removing the ill effects of Blights, or Insects.* To the person, who shall discover to the Society the most effectual method of removing the ill effects of blights, or insects, on fruit-trees and culinary plants, superior to any hitherto known or practised, and verified by actual and comparative experiments; the gold medal or thirty guineas, The *accounts* and *certificates* to be delivered to the Society on or before the first Tuesday in February, 1803.

8. *Comparative Tillage.* For the most satisfactory set of experiments, made on not less than eight acres of land, four of which to be trench-ploughed, and four to be ploughed in the usual manner, in order to ascertain, in what cases it may be adviseable to shorten the operations of tillage, by adopting one trench-ploughing, for the purpose of burying the weeds, instead of the method, now in common use, of ploughing and harrowing the land three or four times, and raking the weeds together and burning them; the gold medal, or forty guineas. It is required, that every operation and expence attending each mode of culture be fully and accurately described, and that proper *certificates* of the nature and condition of the land, on which the experiments are made, together with a circumstantial account of the appearance of the subsequent crops during their growth;

growth ; and also of the quantity and weight of the corn and straw under each mode of culture, or, in case of a green crop, the weight of an average sixteen perches, be produced to the Society on or before the first Tuesday in February, 1803.

9. *Comparative Culture of Wheat, broad-cast, drilled, and dibbled.* For the best set of experiments made on not less than twelve acres, four of which to be sown broad-cast, four drilled, and four dibbled, the two latter in equi-distant rows, in order fully to ascertain which is the most advantageous mode of cultivating wheat ; the gold medal, or forty guineas. It is required, that every operation and expense of each mode of culture be fully described ; and that proper *certificates* of the nature and condition of the land, on which the experiments are made, together with an *account* of the produce of the corn, the weight per bushel, and also of the straw, be produced to the Society on or before the first Tuesday in February, 1803.

10. *Beans.* To the person who, in the year 1802, shall discover and cultivate, either by the drill or dibbling method, on not less than five acres, a species of horse-beans or tick-beans, that will ripen their seeds before the 21st of August ; the silver medal, or twenty guineas. It is required, that a particular account of the
bean,

bean, the cultivation, and the expenſe attending it, with proper *certificates* of the nature and condition of the land, on which the experiments are made, together with an *account* of the produce, the weight per Wincheſter buſhel, and a ſample of not leſs than a quart, be produced to the Society on or before the firſt Tueſday in December, 1802. It is apprehended that, if a bean ſhould be brought into cultivation with the habits of the hotſpur, or other early peas, it would, in a great meaſure, eſcape the danger ariſing from the collier-inſect, or other inſects, and allow more time for the farmers to till the land for the ſubſequent crop of wheat. The *accounts* and *certificates* to be delivered on or before the firſt Tueſday in December, 1802.

11. The ſame premium is extended one year farther. The *accounts* and *certificates* to be delivered on or before the firſt Tueſday in December, 1803.

12. *Comparative Culture of Turnips.* For the beſt ſet of experiments made on not leſs than eight acres of land, four of which to be ſown broad-caſt, and four drilled, to aſcertain whether it is moſt advantageous to cultivate turnips by ſowing them broad-caſt and hand-hoeing them, or by drilling them in equi-diſtant rows, and hand or horſe-hoeing the intervals ; the ſilver medal, or twenty guineas. It is required,

quired, that every operation and expence of each mode of culture be fully described, and that proper *certificates* of the nature and condition of the land, on which the experiments were made, together with the weight of the turnips grown, on a fair average sixteen perches of land, under each mode of culture, be produced to the Society on or before the first Tuesday in March, 1803. The object, which the Society have in view in offering this premium, is experimentally to ascertain the most advantageous method of growing turnips. To do this in a satisfactory manner, both the drilled and broad-cast crops should have the advantage of the most perfect cultivation; consequently the drilled crops should have the intervals between the rows worked by the horse and hand-hoe, or by both these implements; and the rows should be either weeded or hand-hoed. The broad-cast crop should have every advantage, which weeding and hand-hoeing can give it, consistently with leaving the soil a flat surface.

13. The same premium is extended one year farther. *Certificates* to be produced on or before the first Tuesday in March, 1804.

14. *Parsnips*. To the person who, in the year 1803, shall cultivate the greatest quantity of land, not less than five acres, with parsnips,
for

for the sole purpose of feeding cattle or sheep ; the gold medal, or thirty guineas. *Certificates* of the quantity of land so cultivated, with a particular *account* of the nature of the soil and weight of the produce on sixteen perches, and also of the condition of the cattle or sheep fed with the parsnips, and the advantages resulting from the practice, to be produced to the Society on or before the second day in November, 1803.

15. *Buck Wheat.* To the person, who shall cultivate the greatest quantity of land with buck wheat, not less than thirty acres ; the gold medal. It is required, that the time of sowing and reaping be noticed, also a particular *account* of the species, cultivation, and expense attending it, the manner of reaping it, threshing it, and housing the grain, with proper *certificates* of the nature and condition of the land, on which the experiments were made, and the name of the crop, if any, which the same land bore the preceding year, together with an *account* of the produce, and a sample of the seed, not less than a quart, be produced to the Society on or before the second Tuesday in January, 1803.

16. For the next greatest quantity, not less than fifteen acres, on similar conditions ; the
silver

silver medal. Information respecting its application to the feeding of cattle, hogs, and poultry, and other of its uses, is also desired. It is known to be particularly serviceable in furnishing honey to bees.

27. *Raising Grass Seeds.* To the person, who shall raise the greatest quantity of each or any of the following named grass seeds, *viz.*—Meadow fox-tail (*alopecurus pratensis*), sweet scented vernal grass (*anthoxanthum odoratum*), Timothy grass, meadow fescue grass, smooth-stalked meadow grass (*poa pratensis*), rough-stalked meadow grass (*poa trivialis*); the silver medal, or ten guineas. It is required, that *certificates* from persons, who have viewed them in a proper state, to identify that they are one or other of the seeds above-mentioned, indicating clearly the particular species, and noticing the quantity produced of such seeds, free from weeds or mixture of other grasses, together with proper samples of the seeds, be produced to the Society on or before the first day of February, 1803.

18. The same premium is extended one year farther. *Certificates* to be produced on or before the first day of February, 1804.

19. *Rotation of Crops.* To the person who shall, between the 10th of August, 1801, and the 10th of September, 1803, cultivate the
G greatest

greatest quantity of land, not less than forty acres, in the following rotation, *viz.*—1st, winter-tares ; 2d, turnips ; and 3d, wheat ; and apply the two former crops, in the best and most farmer-like manner, to the rearing, supporting, and fattening horses, cattle, sheep, or hogs, on the land which produced the crops ; the gold medal, or one hundred guineas.

20. For the next in quantity and merit, on not less than thirty acres ; the silver medal, or fifty guineas.

21. For the next in quantity and merit, on not less than twenty acres ; the silver medal. It is required, that every operation and expense be fully described, and that satisfactory *certificates* of the nature and condition of the soil, on which the crops have grown, together with an *account* of their appearance, the number of horses and cattle, sheep or hogs, fed by the two green crops, and, as near as possible, the improved value of the live stock by the consumption of those crops, and also the quantity of wheat per acre, and its weight per bushel, be produced to the Society on or before the first day of November, 1804.

It is presumed, that very great advantages will arise to such agriculturists as shall adopt this rotation of crops on a dry soil. They will be enabled, with the addition of a few acres of
turnip-

turnip-rooted cabbage for spring-food, to keep such large flocks of sheep and herds of neat cattle as may secure a sufficient quantity of manure to fertilize their land in the highest degree, and in every situation. It is farther conceived that wheats, which will bear sowing in the spring, will be particularly suitable for this premium.

22. The same premium is extended one year farther. *Certificates* to be delivered on or before the first day of November, 1805.

23. *Preserving Turnips.* To the person, who shall discover to the Society the best and cheapest method of preserving turnips perfectly sound, and in every respect fit for the purpose of supporting and fattening sheep and neat cattle, during the months of February, March, and April; the gold medal, or thirty guineas. It is required, that a full and accurate *account* of the method employed, and the expense attending the process, together with *certificates* that the produce of four acres at the least have been preserved according to the method described, and applied to the feeding of sheep and neat cattle; that the whole were drawn out of the ground before the first day of February, in order to clear the greater part of it previous to its being prepared for corn, and to save the soil from being exhausted by the turnips; and also

also of the weight of an average sixteen perches of the crop ; be produced to the Society on or before the first Tuesday in November, 1803.

N. B. *It is recommended to those, who may be induced to try the necessary experiments for obtaining this and the following four premiums, to consider the method employed for the preservation of potatoes in ridges, (which the growers call pies) and also the propriety of adopting a similar method in cases where they are previously frozen. It is supposed that, in the latter instance, the addition of ice or snow, and the construction of the ridges upon a large scale, may be sufficient to preserve the freezing temperature till the vegetables are wanted for the use of cattle or sheep, at which time they may be thawed by immersion in cold water, and the rot, which a sudden thaw produces, may be prevented.*

24. For the next in quantity and merit, on not less than two acres, the silver medal, or fifteen guineas.

25. *Preserving Cabbages.* To the person, who shall discover to the Society the best and cheapest method of preserving drum-headed cabbages perfectly sound, and in every respect fit for the purpose of supporting and fattening sheep and neat cattle during the months of February, March, and April ; the gold medal, or thirty guineas.

26. For the next in quantity and merit, on not less than two acres, the silver medal, or fifteen guineas. Conditions the same as for preserving turnips, *Cl.* 23. And the *accounts* to be produced on or before the first Tuesday in November, 1803.

27. *Preserving Carrots, Parsnips, or Beets.* To the person, who shall discover to the Society the best and cheapest method of preserving carrots, parsnips, or beets, perfectly sound, and in every respect fit for the purpose of supporting horses, and fattening sheep and neat cattle, during the months of February, March, and April; the silver medal, or fifteen guineas. Conditions the same as for preserving turnips, *Cl.* 23. and the *accounts* to be delivered in on or before the first day in November, 1803.

28. *Preserving Potatoes.* To the person, who shall discover to the Society the best and cheapest method of preserving potatoes, two or more years, perfectly sound, without vegetating, and in every other respect fit for the purpose of sets and the use of the table, and, consequently, of supporting and fattening cattle; the silver medal, or twenty guineas. It is required, that a full and accurate *account* of the method employed, and the expense attending the process, with *certificates* that one hundred bushels at the least have been preserved according to the method

thod described, and that one or more bushels of the same potatoes have been set, and produced a crop without any apparent diminution of their vegetative power ; and also that they have been used at table, with entire satisfaction to the person who eat of them, together with a sample of one bushel, be sent to the Society on or before the first Tuesday in November, 1804.

29. *Making Meadow-Hay in wet Weather.* To the person, who shall discover to the Society the best and cheapest method, superior to any hitherto practised, of making meadow-hay in wet weather ; the gold medal, or thirty guineas. A full *account* of the method employed, and of the expense attending the process, with not less than fifty-six pounds of the hay ; and *certificates* that at least the produce of six acres of land has been made according to the method described, and that the whole is of equal quality with the samples ; to be produced on or before the first Tuesday in January, 1803.

30. *Harvesting Corn in wet Weather.* To the person, who shall discover to the Society the best and cheapest method, superior to any hitherto practised in harvesting corn in wet weather ; the gold medal, or thirty guineas. A full *account* of the method employed, and of the expense attending the process, with not less than

two

two sheaves of the corn, and *certificates* that at least the produce of ten acres has been harvested according to the method described, and that the whole is of equal quality with the samples, to be produced on or before the first Tuesday in January, 1803.

31. *Manures*. For the most satisfactory set of experiments, to ascertain the comparative advantages of the following manures, used as top-dressings on grass or corn land, viz. soot, coal-ashes, wood-ashes, lime, gypsum, night-soil, or any other fit article; the gold medal, or the silver medal and twenty guineas. It is required, that the above experiments be made between two or more of the above-mentioned manures, and that not less than two acres of land be dressed with each manure. An *account* of the nature of the soil, quantity, and expense of the manure and crops, with *certificates*, to be produced on or before the last Tuesday in February, 1803.

32. The same premium is extended one year farther. The *accounts* and *certificates* to be produced on or before the last Tuesday in February, 1804.

33. *Gaining Land from the Sea*. To the person, who shall produce to the Society an account of the best method, verified by actual experiment, of gaining land from the sea, not less
than

than twenty acres, on the coast of Great Britain or Ireland ; the gold medal. *Certificates* of the quantity of land, and that the experiments were begun after the first of January, 1796, to be produced to the Society on or before the first Tuesday in October, 1802.

34. The same premium is extended one year farther. *Certificates* to be produced on or before the first Tuesday in October, 1803.

35. The same premium is extended one year farther. *Certificates* to be produced on or before the first Tuesday in October, 1804.

36. *Machine for dibbling Wheat.* To the person, who shall invent a machine, superior to any hitherto known or in use, to answer the purpose of dibbling wheat, by which the holes for receiving the grain may be made at equal distances and proper depths ; the silver medal, or twenty guineas. The *machine*, with *certificates* that at least three acres have been dibbled by it, to be produced to the Society on or before the second Tuesday in January, 1803. Simplicity and cheapness in the construction will be considered as principal parts of its merit.

37. *Machine for reaping or mowing Corn.* For inventing a machine to answer the purpose of mowing or reaping wheat, rye, barley, oats, or beans, by which it may be done more expeditiously and cheaper than by any method now practised

practised, provided it does not shed the corn or pulse more than the methods in common practice, and that it lays the straw in such a manner that it may be easily gathered up for binding; the gold medal, or thirty guineas. The *machine*, with *certificates* that at least three acres have been cut by it, to be produced to the Society on or before the second Tuesday in December, 1802. Simplicity and cheapness in the construction will be considered as principal parts of its merit.

38. *Threshing-Machine*. To the person, who shall invent a machine, by which corn of all sorts may be threshed more expeditiously, effectually, and at a less expense, than by any method now in use; the gold medal, or thirty guineas. The *machine*, or a model with proper *certificates*, that such a machine has been usually applied, that at least thirty quarters have been threshed by it, and of the time employed in the operation, to be produced to the Society on or before the last Tuesday in February, 1803.

39. *Destroying the grub of the Cock-chaffer*. To the person, who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying the grub of the cock-chaffer, or of preventing or checking the destructive effects, which always attend corn, peas, beans, and turnips, when attacked by those

those insects ; the gold medal, or thirty guineas. The *accounts*, with proper *certificates*, to be produced on or before the first Tuesday in January, 1803.

40. *Destroying Worms*. To the person, who shall discover to the Society an effectual method, verified by repeated and satisfactory trials, of destroying worms, or of preventing the destructive effects they occasion on corn, beans, peas, or pulse ; the gold medal, or thirty guineas. The *accounts*, with proper *certificates*, to be produced to the Society on or before the first Tuesday in January, 1803.

41. *Destroying the Fly on Hops*. To the person, who shall discover to the Society an easy and efficacious method of destroying the fly on hops, superior to any hitherto known or practised, on not less than four acres of hop ground ; the gold medal, or thirty guineas. *Accounts* and *certificates* to be delivered to the Society on or before the first Tuesday in February, 1803.

42. *Cure of the Rot in Sheep*. To the person, who shall discover to the Society the best and most effectual method of curing the rot in sheep, verified by repeated and satisfactory experiments ; the gold medal, or fifty guineas. It is expected, that the candidates furnish accurate *accounts* of the symptoms and cure of the disease, together with the imputed causes thereof,
and

and the actual or probable means of prevention, which, with proper *certificates*, must be delivered to the Society on or before the first Tuesday in February, 1803.

43. *Preventing the ill Effects of Flies on Sheep.* To the person, who shall discover to the Society the most effectual method of protecting sheep from being disturbed and injured by flies; the silver medal, or twenty guineas. It is required, that the method be ascertained by repeated experiments, and that a *certificate* of its efficacy be delivered to the Society on or before the first Tuesday in December, 1802.

44. *Protecting Sheep.* To the person who, in the year 1802, shall protect the greatest number of sheep, not fewer than one hundred, by hovels, sheds, or any other means, and give the most satisfactory account, verified by experiment, of the advantages arising from the practice of protecting sheep from the inclemency of the weather, by hovels, sheds, or any other means; the silver medal, or twenty guineas. A particular *account* of the experiments made, with the advantages arising therefrom, together with the expense, and the *certificates* of its utility, to be produced to the Society on or before the first Tuesday in March, 1803.

45. The same premium is extended one year farther. The *accounts* and *certificates* to be delivered

vered on or before the first Tuesday in March, 1804.

N. B. It is required, that the *certificates* shall specify the length of time the sheep were so protected, and the manner in which they were maintained during that time ; together with the general method of managing them.

46. *Raising Water for the Irrigation of Land.* To the person, who shall discover to the Society the cheapest and most effectual method of raising water in quantities sufficient to be beneficially employed for the purpose of irrigating land, superior to and cheaper than any other method now in use ; the gold medal, or thirty guineas. A model on a scale of one inch to a foot, with *certificates*, that a machine at large on the same construction has been used, specifying the quantity of water delivered in gallons per hour, and the height to which it was raised, to be produced to the Society on or before the first of March, 1803.

The same premium is extended one year farther. *Certificates* to be produced on or before the first of March, 1804.

P R E M I U M S
FOR
DISCOVERIES AND IMPROVEMENTS
IN
CHEMISTRY, DYEING,
AND
MINERALOGY.

47. *Preserving Seeds of Vegetables.* For the best method of preserving the seeds of plants in a state fit for vegetation a longer time than has hitherto been practised, such method being superior to any known to the public, and verified by sufficient trial, to be communicated to the Society on or before the first Tuesday in December, 1802; the gold medal, or thirty guineas.

48. *Preventing the Dry-Rot in Timber.* To the person, who shall discover to the Society the cause of the dry-rot in timber, and disclose a certain method of prevention superior to any hitherto

hitherto known ; the gold medal, or thirty guineas. The *accounts* of the cause, and method of prevention, confirmed by repeated experiments, to be produced to the Society on or before the second Tuesday in December, 1802.

49. *Preserving salted Provisions from becoming rancid or rusty.* To the person, who shall discover to the Society the best, cheapest, and most efficacious method of preserving salted provisions from growing rancid or rusty ; the gold medal, or thirty guineas. A full description of the method, with proper *certificates* that it has been found, on repeated trials, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in February, 1803.

50. *Clearing Feathers from their animal Oil.* To the person, who shall discover to the Society the best and most expeditious method, superior to any hitherto practised, of clearing goose-feathers from their offensive animal oil, for the use of upholders, in making beds, cushions, &c. the silver medal, or twenty guineas. A quantity of such feathers unstripped and so cleared, not less than forty pounds weight, with a full *account* of the process, to be produced to the Society on or before the first Tuesday in February, 1803.

51. *Refining*

51. *Refining Whale or Seal Oil.* For disclosing to the Society an effectual method of purifying whale or seal oil from the glutinous matter, that incrusts the wicks of lamps and extinguishes the light, though fully supplied with oil; the gold medal, or fifty guineas. It is required, that the whole of the process be fully and fairly disclosed, in order that satisfactory experiments may be made by the Society to determine the validity of the claim; and *certificates* that not less than twenty gallons have been purified according to the process delivered in, together with two gallons of the oil, in its unpurified state, and two gallons so refined, be produced to the Society on or before the second Tuesday in February, 1803.

52. *Manufacturing Tallow-Candles.* To the person, who shall discover to the Society a method of hardening or otherwise preparing tallow, so that candles may be made of it, which will burn as clear and with as small a wick as wax candles, without running, and may be afforded at a less expense than any at present made with spermaceti; the gold medal, or thirty guineas. *Certificates* that 112lb. of such tallow have been made into candles, and 12lb. of the candles made thereof, to be produced to the Society on or before the second Tuesday in January, 1803.

53. *Candles*

53. *Candles from Resin or other Substances.* To the person, who shall discover to the Society the best method of making candles of resin, or any other substance, fit for common use, at a price much inferior to those made of tallow only ; the gold medal, or thirty guineas. Six pounds at least so prepared, with an *account* of the process, to be delivered to the Society on or before the first Tuesday in December, 1802.

54. *Method of separating Sugar in a solid form from Treacle.* To the person, who shall discover to the Society the best method of separating sugar from treacle in a solid form, at such an expense as will render it advantageous to the public ; the gold medal, or fifty guineas. A quantity of the sugar so prepared in a solid form, not less than thirty pounds weight, with an *account* of the process, and *certificates* that not less than one hundred weight has been prepared, to be produced to the Society on or before the first Tuesday in February, 1803.

55. *Proof-Spirit.* To the distiller who, in the year 1802, shall make the greatest quantity, not less than one hundred gallons, of a clean marketable spirit, from articles not the food of man or cattle, equal in strength or quality to the proof-spirit now in use, and at a rate not higher than the spirit produced from corn or melasses ;

melasses; the gold medal, or one hundred guineas. Ten gallons of the spirit, together with proper *certificates*, and a full *account* of the expense and mode of making it, to be produced to the Society on or before the first Tuesday in January, 1803.

56. *Increasing Steam.* To the person, who shall invent and discover to the Society a method, verified by actual experiments, of increasing the quantity or force of steam, in steam-engines, with less fuel than has hitherto been employed, provided that in general the whole amount of the expenses in using steam-engines may be considerably lessened; the gold medal, or thirty guineas. To be communicated to the Society on or before the first Tuesday in January, 1803.

57. *Preparation of Tan.* To the person, who shall prepare in the most concentrated form, so as to be easily portable, and at a price applicable to the purposes of manufacturers, the largest quantity, not less than one hundred weight, of the principle called by the French *tannin*, which abounds in oak-bark and many other vegetable substances; the gold medal, or fifty guineas. *Certificates* of the above quantity having been prepared, and a sample of not less than 28lb. to be produced to the Society

H

on

on or before the last Tuesday in January, 1803.

58. *Preparation of a red Stain for Cotton Cloth.* To the person, who shall communicate to the Society the cheapest and most effectual method of printing or staining cotton cloth with a red colour, by an immediate application of the colouring matter to the cloth, equally beautiful and durable with the red colours now generally procured from decoctions of madder; the gold medal, or thirty guineas. *Certificates* that the above process has been advantageously used on ten pieces of callico, each twenty-one yards or upwards in length, one piece of callico so printed, a quart of the colour in the liquid state, and a full *account* of the preparation and application, to be produced to the Society on or before the second Tuesday in January, 1803.

59. *Preparation of a green Colour for printing cotton Cloth.* To the person, who shall communicate to the Society the best and cheapest method of printing with a full green colour on cotton cloth, by an immediate application of the colouring matter from a wooden block to the cloth, equally beautiful and durable as the colours now formed from the complicated process of the decoction of weld on alumine and the solutions of indigo by earths or alkaline
line

line falts ; the gold medal, or thirty guineas. *Certificates* and conditions as for premium 58.

60. *Substitute for the Basis of Paint.* To the person, who shall produce to the Society the best substitute, superior to any hitherto known, for the basis of paint, equally proper for the purpose as the white lead now employed ; such substitute not to be of a noxious quality, and to be afforded at a price not materially higher than that of white lead ; the gold medal, or one hundred guineas. A quantity of the substitute, not less than 50lb. weight, with an *account* of the process used in preparing it, and *certificates* that at least one hundred weight has been manufactured, to be produced to the Society on or before the first Tuesday in January, 1803.

61. *Red Pigment.* To the person, who shall discover to the Society a full and satisfactory process for preparing a red pigment, fit for use, in oil or water, equal in tone and brilliancy to the best carmines and lakes now known or in use, and perfectly durable ; the gold medal, or thirty guineas. One pound weight of such colour, and a full disclosure of its preparation, to be produced to the Society on or before the first Tuesday in February, 1803.

N. B. It is not required, that the colour should resist the action of fire or chemical applications,

cations, but remain unaltered by the common exposure to strong light, damp, and noisome vapours.

62. *Ultramarine.* To the person, who shall prepare an artificial ultramarine, equal in colour, brilliancy, or durability, to the best prepared from lapis lazuli, and which may be afforded at a cheap rate ; the gold medal, or thirty guineas. The conditions are the same as in the preceding premium for the red pigment.

63. *Preparation of sulphuric Acid from Sulphur without the use of any nitric Salt.* To the person, who shall prepare the largest quantity (not less than one ton) of sulphuric acid from sulphur, without any nitric salt, of a specific gravity, not inferior to the best sulphuric acid of commerce ; the gold medal, or fifty guineas. *Certificates* that not less than the above quantity of such an acid has been prepared, together with a sample, to be produced to the Society on or before the first Tuesday in January, 1803.

64. *Preserving Iron from Rust.* To the person, who shall invent and discover to the Society a cheap composition, superior to any now in use, which shall effectually preserve wrought iron from rust, the gold medal, or
fifty

fifty guineas. A full description of the method of preparing the composition, with *certificates* that it has stood at least two years unimpaired, being exposed to the atmosphere during the whole time, to be produced to the Society, with ten pounds weight of the composition, on or before the first Tuesday in January, 1803.

65. *Refining Block-tin.* To the person, who shall discover to the Society the best method of purifying or refining block-tin, so as to render it fit for the finest purposes, to which grain-tin is now applied, and not higher in price ; the gold medal, or fifty guineas. *Certificates* that not less than three tons have been refined or purified, with a full detail of the process, and a quantity, not less than one hundred weight, of the tin so refined, to be produced to the Society on or before the first Tuesday in January, 1803.

66. *Glazing Earthen-ware without Lead.* To the person, who shall discover to the Society the cheapest, safest, most durable, and most easily fusible composition, fit for the purpose of glazing the ordinary kinds of earthen-ware, without any preparation of lead, and superior to any hitherto in use ; the gold medal, or thirty guineas. Specimens of the ware so glazed, with proper *certificates* of its having succeeded, and a sample of the materials made use

use of, to be produced to the Society on or before the first Tuesday in February, 1803.

67. *Refining Copper from the Ore.* To the person, who shall discover to the Society the best method of separating, purifying, and refining copper from the ore, so as to render it fit for the finest purposes, to which fine copper is now applied, and by a process superior to any hitherto known or in use, and not higher in price; the gold medal, or fifty guineas. *Certificates* that not less than three tons have been so prepared or refined, and a quantity not less than one hundred weight of the copper so refined, to be produced to the Society on or before the first Tuesday in February, 1803.

68. *Mineralogical Map of England and Wales.* To the person, who shall complete and publish an accurate mineralogical map of England and Wales, on a scale of not less than ten miles to an inch, containing an account of the situation of the different mines therein, and describing the kinds of minerals thence produced; the gold medal, or fifty guineas. *Certificates* of the accuracy of such map, together with the map, to be produced to the Society on or before the first Tuesday in February, 1804. The map to remain the property of the Society.

69. *Mineralogical Map of Ireland.* The same premium is offered for a mineralogical map of Ireland on similar conditions.

70. *Mineralogical*

70. *Mineralogical Map of Scotland.* The same premium is offered for a mineralogical map of Scotland on similar conditions.

PREMIUMS

IN

POLITE ARTS.

71. *Honorary Premiums for Drawing, by Nobility.* For the best drawing of any kind, made with water-colours, crayons, chalk, black-lead, pen, Indian ink, or bister, by young gentlemen under the age of twenty-one, sons or grandsons of peers, or peeresses in their own right, of Great Britain or Ireland, to be produced on or before the first Tuesday in March, 1803; the honorary medal of the Society in gold.

72. The same in silver for the next in merit.

73. The same premiums will be given, on the like conditions, to young ladies, daughters
or

or grand-daughters of peers, or peereſſes in their own right, of Great Britain or Ireland.

74. *Honorary Premiums for Drawing, by Gentlemen.* For the beſt drawing, of any kind, made with water-colours, crayons, chalk, black-lead, pen, Indian ink, or biſter, by young gentlemen under the age of twenty-one ; to be produced before the firſt Tueſday in March, 1803 ; the gold medal.

75. For the next in merit, the ſilver medal.

76. The ſame premiums will be given for drawings by young ladies.

N. B. As the foregoing honorary premiums are intended only for ſuch of the nobility and gentry as may hereafter become patrons or patroneſſes of the arts ; perſons profeſſing any branch of the polite arts, or any buſineſs depending on the arts of deſign, or the ſons or daughters of ſuch perſons, will not be admitted candidates in theſe claſſes.

77. *Statuary Marble.* To the perſon, who ſhall diſcover, within Great Britain or Ireland, a quarry of white marble fit for the purpoſes of ſtatuary, and equal in all reſpects to thoſe kinds now imported from Italy ; the gold medal, or one hundred pounds. A block of at leaſt three feet in length, two in height, and
two

two in width, with an account of the situation of the quarry, and *certificates* of its possessing considerable extent, to be produced to the Society on or before the first Tuesday in February, 1803.

N. B. In order to prevent useless expence or trouble to the claimant in forwarding so large a block, the Society will be ready to examine any smaller specimen of the marble, and express their opinion of its value to the candidate, before the block required by the above premium is produced.

PREMIUMS

FOR

ENCOURAGING AND IMPROVING

MANUFACTURES.

78. *Machine for carding Silk.* For the best machine, superior to any now in use, for carding waste filk equally well as by hand; to be produced, together with a specimen of the cardings, on or before the first Tuesday in November,

vember, 1802 ; the silver medal, or twenty guineas.

79. *Transparent Paper.* To the person, who shall discover to the Society a method of making paper from the pulp that shall be perfectly transparent, and of a substance and body equal to fools-cap, that shall take and bear common writing ink with the same facility and correctness as writing paper generally in use ; the silver medal, or twenty guineas. *Certificates* of the making such paper, an *account* of the process, and one ream of the paper, to be produced on or before the second Tuesday in January, 1803.

PREMIUMS

IN

MECHANICS.

80. *Gunpowder-Mills.* To the person who, in the year 1802, shall invent and bring to perfection the most effectual method of so conducting the works of gunpowder-mills, in the business of making gunpowder, as to prevent explosion ;

explosion; the gold medal, or one hundred guineas. *Certificates* and *accounts* of the method having been put in practice in one or more gunpowder-mills in this kingdom, and that it promises, in the opinion of the best judges concerned in such works, to answer the purpose intended, to be produced to the Society on or before the first Tuesday in Feb. 1803.

N. B. As an encouragement to persons to turn their thoughts to improvements of this nature, if any should be made on the present method of conducting the business of gunpowder making, which fall short of the total prevention of explosion, and they are sent to the Society for the sake of humanity, the papers so sent in will receive due consideration, and such bounty or reward will be bestowed thereon as they appear to merit.

81. *Transit-Instrument.* To the person, who shall invent and produce to the Society a cheap and portable transit-instrument, which may easily be converted into a zenith-sector, capable of being accurately and expeditiously adjusted for the purpose of finding the latitudes and longitudes of places, and superior to any portable transit-instrument now in use; the gold medal, or forty guineas. To be produced on or before the last Tuesday in January, 1803.

82. *Taking*

82. *Taking Whales by the Gun-Harpoon.* To the person who, in the year 1802, shall strike the greatest number of whales, not fewer than three, with the gun-harpoon; ten guineas.— Proper *certificates* of the striking such whales, and that they were actually taken in the year 1802, signed by the master, or by the mate, when the claim is made by the master, to be produced to the Society on or before the last Tuesday in December, 1802.

83. *Family Mill.* To the person, who shall invent and produce to the Society the best constructed mill for grinding corn for the use of private families, or parish-poor; the construction to be such as to render the working of the mill easy and expeditious, and superior to any hitherto in use; the gold medal, or thirty guineas. The mill, and *certificates* of its having been used to good effect, to be produced to the Society on or before the first Tuesday in February, 1803.

N. B. Cheapness and simplicity will be considered as essential parts of its merit; and the mill, or the model, to remain with the Society.

84. *Machine for raising Coals, Ore, &c. &c.*— To the person, who shall invent a machine for raising coals, ore, &c. from mines, superior to
any

any hitherto known, or in use, and which shall produce the effect at a less expense than those already known or in use; the gold medal, or fifty guineas. A model of the machine, made on a scale of not less than one inch to a foot, with a *certificate* that a machine at large on the same construction has been advantageously used, to be produced to the Society on or before the second Tuesday in February, 1803.

85. *Machine for raising Water.* To the person, who shall invent a machine on a better, cheaper, and more simple construction than any hitherto known or in use, for raising water out of wells, &c. from a depth of not less than fifty feet; the gold medal, or forty guineas. *Certificates* of the performance of the machine, and a model of it, on a scale of not less than one inch to a foot, to be produced to the Society on or before the first Tuesday in February, 1803.

86. *Machine for making Bricks.* To the person, who shall invent the best and cheapest machine for making bricks, superior to any hitherto known or in use, whereby the labour and expense of making bricks in the usual mode, by hand, may be greatly diminished; forty guineas. A model, with *certificates* that a machine at large, on the same construction, has been used to good effect for the purpose of making

making bricks, and that at least one hundred thousand statute-bricks have been made therewith, to be produced to the Society on or before the first Tuesday in March, 1803.

87. *Boring and Blasting Rocks.* To the person, who shall discover to the Society a more simple, cheap, and expeditious method, than any hitherto known or in use, of boring and blasting rocks in mines, shafts, wells, &c. ; the gold medal, or thirty guineas. *Certificates* of the method having been practised with success, with a full description thereof, to be delivered to the Society on before the first Tuesday in January, 1803.

88. *Heating Rooms for the purpose of Manufacturers.* To the person, who shall invent and discover to the Society a method of heating rooms, superior to any hitherto known or in use, and at a moderate expense, for the purposes of painters, japanners, and other manufacturers, so as to avoid the necessity of iron or copper tunnels going through the rooms to convey the smoke, whereby the danger from such tunnels may be prevented ; the gold medal, or forty guineas. A model, or complete drawing and description of the method, with *certificates* that it has been successfully practised, to be delivered to the Society on or before the last Tuesday in March, 1803.

89. *Improved*

89. *Improved Ventilation.* To the person, who shall invent and produce to the Society a mode of permanently ventilating the apartments in hospitals, work-houses, and other crowded places, superior to any now known or used; the gold medal, or fifty guineas. A model of the apparatus, and a full account of the means, by which the effect has been produced, with proper *certificates*, to be delivered to the Society on or before the last Tuesday in February, 1803.

90. *Mill Stones.* To the person, who shall, between the first of February, 1802, and the first of February, 1803, prepare and bring into use the greatest number of mill stones, taken from any quarry in the United Kingdoms, equal in quality to the French burrs, not less than thirty pair; the gold medal, or thirty guineas. *Certificates* that the said mill stones were all taken from the same quarry, with their prices and dimensions, that they are equal to the French burr, not less than three feet eight inches diameter, and are actually in use, to be produced to the Society on or before the third Tuesday in February, 1803.

91. For the next greatest quantity, not less than twenty-five pair; the silver medal, or fifteen guineas, on similar terms.

92. *Preventing*

92. *Preventing Accidents from Horses falling with two-wheeled Carriages.* To the person, who shall invent and produce to the Society a method superior to any hitherto known or in use, to prevent accidents from the falling of horses with two-wheel carriages, especially on steep declivities; the silver medal, or fifteen guineas. A model of the apparatus, and a full account of the means by which the effect has been produced, with proper *certificates* that the same has been used with success, to be delivered to the Society on or before the second Tuesday in January, 1803.

93. *Clearing the Turnpike and other Roads in Winter from Mud, and in Summer from Dust.* To the person, who shall discover to the Society the most effectual and the cheapest method, verified by experiments, of clearing the turnpike and other roads of great resort, in winter from mud, and in summer from dust, or most effectually preventing the accumulation of either; the gold medal, or fifty guineas.

94. For the second best account; the silver medal, or twenty guineas. It is required, that an accurate *account* of the method used, and every expense attending it, together with satisfactory *certificates* of its being effectual, be delivered to the Society on or before the first Tuesday in March, 1803.

CONDITIONS

CONDITIONS FOR THE POLITE ARTS.

No person, who has gained the first premium in any class, shall be admitted a candidate in a class of an inferior age; and no candidate shall receive more than one premium in one year; nor shall they, who for two successive years have gained the first premium in one class, be again admitted as candidates in that class.

No person shall be admitted a candidate in any class, who has three times obtained the first premium in that class.

No more than one performance in any class shall be received from the same candidate.

All performances (to which premiums or bounties are adjudged) shall remain with the Society till after the public distribution of rewards in May, when they will be re-delivered unless mentioned in the premiums to the contrary.

No performance shall be admitted, that has obtained a premium, reward, or gratification, from any other society, academy, or school, or been offered for that purpose.

All performances, that obtain premiums in the Polite Arts, must have been begun after the publication of such premiums, except line engravings.

To encourage real merit, and prevent attempts to impose on the Society, by producing drawings made or retouched by any other person than the candidate, the Society require a specimen of the abilities of each successful candidate in classes 97 to 122 inclusive, under the inspection of the Committee of Polite Arts, in every instance where such proof may appear necessary.

All candidates in the Polite Arts are required to signify, on their drawings, their age; and whether the performances are originals or copies; and if copies, whence they were taken.

Society's Office, Adelphi, June 1st, 1802.

ORDERED,

ORDERED,

That the several Candidates and Claimants, to whom the Society shall adjudge Premiums or Bounties, do attend at the Society's Office, in the Adelphi, on the last Tuesday in May, 1803, at twelve o'clock at noon precisely, to receive the same; that day being appointed by the Society for the distribution of their rewards: And before that time no Premium or Bounty will be delivered, excepting to those who are about to leave the kingdom.

In cases where the Society may think fit to admit excuses for not attending in person, Deputies may be substituted to receive the rewards, provided such deputies are either Members of the Society, or the superior Officers thereof.

GENERAL CONDITIONS.

As the great object of the Society in rewarding individuals is to draw forth, and give currency to those inventions and improvements, which are likely to benefit the public at large, candidates are requested to observe, that if the *means*, by which the respective objects are effected, do require an expense or trouble too great for *general purposes*, the Society will not consider itself bound to give the offered *reward*; but, though it thus reserves the power of giving in all cases such part only of any premium as the performance shall be adjudged to deserve, or of withholding the whole if there be no merit, yet the candidates may be assured the Society will always judge liberally of their several claims.

It is required, that the matters, for which premiums are offered, be delivered in without names, or any intimation to whom they belong; that each particular thing be marked in
what

what manner each claimant thinks fit, such claimant sending with it a paper sealed up, having on the outside a corresponding mark, and, on the inside, the claimant's name and address; and all candidates are to take notice, that no claim for a premium will be attended to, unless the conditions of the advertisements are fully complied with.

No papers shall be opened, but such as shall gain premiums, unless where it appears to the Society absolutely necessary for the determination of the claim; all the rest shall be returned unopened with the matters to which they belong, if inquired after by the mark, within two years; after which time, if not demanded, they shall be publicly burnt, unopened, at some meeting of the Society.

All models of machines, which obtain premiums or bounties, shall be the property of the Society; and, where a premium or bounty is given for any machine, a perfect model thereof shall be given to the Society.

All the premiums of this Society are designed for Great Britain and Ireland, unless expressly mentioned to the contrary.

The

The claims shall be determined as soon as possible after the delivery of the specimens.

No person shall receive any premium, bounty, or encouragement, from the Society, for any matter, for which he has obtained, or proposes to obtain a patent.

A candidate for a premium, or a person applying for a bounty, being detected in any disingenuous method to impose on the Society, shall forfeit such bounty, and be deemed incapable of obtaining any for the future.

The performances, which each year obtain premiums or bounties, are to remain with the Society until after the public distribution of rewards.

No member of the Society shall be a candidate for, or entitled to receive, any premium, bounty, or reward, whatsoever, except the honorary medal of the Society. The candidates are in all cases expected to furnish a particular account of the subject of their claims; and, where certificates are required to be produced in claim of premiums, they should be expressed, as nearly as possible, in the words of the respective advertisements, and be signed by persons, who have a positive knowledge of the fact stated.

Where

Where premiums or bounties are obtained in consequence of specimens produced, the Society mean to retain such part of those specimens as they may judge necessary, making a reasonable allowance for the same.

No candidates shall be present at any meetings of the Society or committees, or admitted at the Society's rooms, after they have delivered in their claims, until such claims are adjudged, unless summoned by the committee.

N. B. The Society farther invite the communications of scientific and practical men upon any of the subjects, for which premiums are offered, although their experiments may have been conducted upon a smaller scale than the terms of each require, as they may afford ground for more extensive application, and thus materially forward the views of the Society, and contribute to the advantage of the public. Such communications to be made by letter, addressed to the Society, and directed to Mr. CHARLES TAYLOR, the Secretary, *at the Society's Office, in the Adelphi, London.*

The models required by the Society should be upon the scale of one inch to a foot. The Winchester bushel is the measure referred to for grain ; and, as the acres of different districts vary in extent, it is necessary to observe, that
the

the Society mean Statute acres, of five and a half yards to the rod or pole, when acres are mentioned in their list of premiums ; and they request, that all communications to them may be made agreeably thereto.

The Society desire, that the Papers on different subjects sent to them may be full, clear, explicit, fit for publication, and rather in the form of Essays than of Letters.

* * * To persons inclined to leave a sum of money to this Society by will, the following form is offered for that purpose :

Item. I give and bequeath to A. B. and C. D. the sum of upon condition and the intent that they, or one of them, do pay the same to the collector, for the time being, of a Society in London, who now call themselves the Society for the Encouragement of Arts, Manufactures, and Commerce ; which said sum of
I will and desire may be paid out of my personal estate, and applied towards the carrying on the laudable design of the Society.

By Order of the Society,

CHARLES TAYLOR,

Secretary.

BOUNTIES AND PREMIUMS

PAID BY THE

DUBLIN SOCIETY.

IN THE YEAR 1802.

Bounties granted for several purposes.

<i>Names</i>	<i>Purposes</i>	<i>Sums Granted.</i>		
		<i>£.</i>	<i>s.</i>	<i>d.</i>
Christopher Hacket.—A model of a forcing pump.		11	7	6
Thomas Tunks.—A Hand-mill of new construction for grinding wheat.		11	7	6
Thomas Tunks.—Towards enabling him to complete his Mill for grinding corn.		34	2	6
Alexander Johnson.—A model of a Kiln for drying corn.		28	8	9
James Lambie.—A family Mill for grinding corn.		17	1	3

James

<i>Names.</i>	<i>Purposes.</i>	<i>Sums Granted.</i>		
		£.	s.	d.
James Lambie.	—A model of a Bark-mill.	5	13	9
Mrs. Campbell.	—To enable her to erect a shed for the preservation of Silk worms.	5	13	9
Mrs. Martha Menzies.	—To enable her the bet- ter to extend the breeding of Silk worms.			
		22	15	0

Premiums granted for preserving BEES.

<i>Claimants.</i>	<i>No. of Stocks.</i>	<i>Sums Granted.</i>		
		£.	s.	d.
John Barret,	57	28	10	0
Andrew Bredan,	19	9	10	0
Thomas Read,	14	7	0	0
James Fawcett,	12	6	0	0
Rev. John Browne,	12	6	0	0
Mrs. E. D. Ahmuty,	11	5	10	0
William Mooney,	10	5	0	0
Alexander Hewit,	9	4	10	0

Premiums

Premiums adjudged in FINE ARTS.

<i>Names.</i>	<i>Purposes.</i>	<i>Premiums.</i>		
		£.	s.	d.
George Grattan.—For the best model in clay.		3	8	3
Henry Watfon.—For drawings of Landscape after nature.		2	5	6
James Brocas.—Do.		1	14	1½
Samuel Brocas.—Do.		1	14	1½
James Brocas.—For drawings in still life.		1	2	9
Constantine Egan.—Do.	in flowers.	1	14	1½
Samuel Patridge.—Do.	Do.	1	2	9
William Cafe.—Do.	Do.	1	2	9
Laurence Ryan.—Do.	Do.	0	11	4½
Robert Connor.—Do.	Do.	0	11	4½
Richard Cuthbert.—For a group of figures from nature.				a silver medal.
Bartholomew Cavanagh.—For best drawings from the round.				Do.
William Grattan.—Second Do.	from Do.			Do.
William Bosshell.—Best drawings from the flat.				Do.
John Fagan.—Second Do.	Do.			Do.
James Brocas.—Best drawings of trees from Laporte.				Do.
Samuel Brocas.—Second Do.	Do.			Do.
William Eaton.—Best Ornaments shaded with Indian ink.				Do.
				James

<i>Names.</i>	<i>Purposes.</i>	<i>Premiums.</i>		
		£.	s.	d.
James Magennis.—	Best Ornaments shaded with chalks.			a silver medal.
Edward Farrel.—	For best drawings of Doric and Ionic orders.			Do.
Peter Cantrell.—	Second Do.	Do.		Do.
John Bowden.—	For best drawings, after Mal- ton's perspective.	}	1	2 9 & S. medal.
James Kinfelagh.—	For second Do.			a silver medal.
Benjamin Norwood.—	For drawings in Architec- ture.	0	11	4½
Peter Cockburne.—	For Do.	0	11	4½
John Kinder.—	Drawing in perspective of public buildings.	5	13	9
Thomas Kelly.—	Engraving on wood, for illustrat- ing works in Arts and Sciences.	5	13	9
William Taylor.—	Engraving a landscape in Aqua- tinta.	2	5	6
James Brocas.—	Etchings of human figures.	3	8	3
Samuel Brocas.—	Do.			a silver medal.

N. B. The adjudging of the Premiums for planting has been deferred to May 1803. See above under the article, *Planting by Contract*.

A LIST

A LIST
OF THE MEMBERS, OFFICERS, &c.
OF THE
DUBLIN SOCIETY,
FOR 1802—3.

PRESIDENT.

His EXCELLENCY PHILIP Earl of HARDWICKE,
LORD LIEUTENANT of Ireland.

VICE-PRESIDENTS.

The Duke of Leinster	John Leigh, Esq.
Lord Frankford	Thomas Burgh, Esq.
Right Hon. John Foster	General Vallancey.
Right Hon. D. Latouche	

TREASURER.

Sir William Gleadowe Newcomen, Bart.

A

Christopher Abbot, Esq.	Earl of Arran, K. P.
Earl of Aldborough	Joseph Atkinson, Esq.
Lord Alexander	John Atkinson, Esq.
Richmond Allen, Esq.	Rev. Gilbert Austin
Earl Annesley	Michael Aylmer, Esq.
Wm. Hen. Archer, Esq.	

Beauch.

B

Beauch. Bagenal, Esq.	Lord De Blaquiere, K. B.
Richard Ball, Esq.	Bindon Blood, Esq.
Benjamin Ball, Esq.	John Boardman, Esq.
Blaney Balfour, Esq.	Robert Bolton, Esq.
John Rose Baker, Esq.	Edward Bolton, Esq.
George Baker, Esq.	Cornelius Bolton, Esq.
Sir William Barker, Bart.	Sir James Bond, Bart.
Robert Barnwall, Esq.	F. Warren Bonham, Esq.
Robert Barnwall, Esq.	Major Botet
Mr. John Barrington	Col. Hugh Bowen
John Barton, Esq.	Wallop Brabazon, Esq.
Rowland Bateman, Esq.	Patrick Bride, Esq.
Rowland Bateman, Esq. jun.	H. Vaughan Brooke Esq.
Earl Belmore	Henry Brookes, Esq.
Dr. Thomas Bell	Rt. Hon. Dennis Browne.
Rt. Hon. John Beresford	Rev. Thomas Brownrigg
Rev. Charles Beresford	Colonel Brownrigg
John C. Beresford, Esq.	Edward Bulkely, Esq.
Mr. Samuel Bewley	Thomas Burgh, Esq. V. P.
John Blachford, Esq.	William Burgh, Esq.
James Blacker, Esq.	John Burke, Esq.
Thomas Blair, Esq.	William Burton, Esq.
Wm. Blakeney, Esq.	Charles Bushe, Esq.
Charles Blake, Esq.	Humphrey Butler, Esq.

C

William Caldbeck, Esq.	Earl of Caledon
Andrew Caldwell, Esq.	Lord Callan

Turner Camac, Esq.	Earl Conyngham
Rev. Robert Cane	Richard Cooper, Esq.
James Cane, Esq.	Edw. Synge Cooper, Esq.
Earl of Carhampton	Joshua Edw. Cooper, Esq.
Alderman J. Carleton	Charles Coote, Esq.
George Carrol, Esq.	Henry Cope, Esq.
John Cassidy, Esq.	Wm. Cope, Esq.
John Cash, Esq.	Mau. Coppinger, Esq.
Archbishop of Cashel	Elias Corbally, Esq.
Walter Cavenagh, Esq.	Robert Corbet, Esq.
Rt. Hon. Sir Henry Caven-	Capt. Dan. Corneille
dish, Bart.	Right Hon. Isaac Corry
Hon. Fred. Cavendish	Sir James Cotter, Bart.
Sir Benj. Chapman, Bart.	J. Hen. Cottingham, Esq.
Viscount Charleville	David Courtney, Esq.
Richard Chenevix, Esq.	James Crawford, Esq.
James Chritchley, Esq.	Viscount Cremorne
Earl of Clanricarde	Rev. John Cromie
Lord Clarina	Alex. Crookshank, Esq.
Dr. Joseph Clarke	Hon. and Rev. Dean Crosbie
Henry Clements, Esq.	Edward Crosbie, Esq.
Earl of Clermont	Leland Crosthwaite, Esq.
Lord Clonbrock	Thomas Crosthwaite, Esq.
Bishop of Clonfert	Francis Cruise, Esq.
Bishop of Cloyne	Hon. & Rev. H. Cuffe
Thomas Cobbe, Esq.	James Cuffe, Esq.
William Colville, Esq.	James Cuppaidge, Esq.
W. Chaig. Colville, Esq.	Eccles Cuthbert, Esq.
James Conolly, Esq.	

D

Fred. Darley, Esq.	Isaac M. D'Olier, Esq.
Judge Day	Ed. Legh D'Olier, Esq.
Bishop of Derry	Sir John D'Oyley, Bart.
Quintin Dick, Esq.	Charles Domville, Esq.
Hugh Dick, Esq.	Earl Donoughmore
Rev. Dean Digby	Ralph Dopping, Esq.
Viscount Dillon	Charles Doyne, Esq.
Sir John Baron Dillon, Bt.	Marquis of Drogheda
Char. Drake Dillon, Esq.	Archbishop of Dublin
William Disney, Esq.	Patrick Duigenan, Esq.
Lt. Col. Moore Disney	Sir William Dunkin, Kt.
Conway Rd. Dobbs, Esq.	Brig. Gen. Dunne
Jeremiah D'Olier, Esq.	Josias Dunn, Esq.

E

Francis Eardley, Esq.	John Everard, Esq.
Isaac Amb. Eccles, Esq.	Major Henry Eustace
If. Amb. Eccles, jun. Esq.	Francis Evans, Esq.
Thomas Ellis, Esq.	William Evans, Esq.
Bishop of Elphin	Richard Evans, Esq.
John Swift Emerson, Esq.	George Evans, Esq.
John Enery, Esq.	Ald. John Exshaw

F

Earl of Farnham	Sir John Ferns
James Farrell, Esq.	John Finlay, Esq.

Earl

Earl of Fingal	Faith. W. Fortescue, Esq.
Colonel Fisher	Rt. Hon. J. Foster, V. P.
Edward Fitzgerald, Esq.	Samuel Foster, Esq.
Rt. Hon. Mau. Fitzgerald	John Wm. Foster, Esq.
Sir T. Jud. Fitzgerald, Bt.	Hon. Tho. Hen. Foster
Viscount Fitzwilliam	Lord Frankfort, V. P.
John Flood, Esq.	Robt. M. Frazer, Esq.
Lundy Foot, Esq.	Charles Frazer, Esq.
Francis Forster, Esq.	Lt. Col. Quin J. Freeman
W. C. Fortescue, Esq.	Wm. Furlong, Esq.
Chichest. Fortescue, Esq.	John Smith Furlong, Esq.

G

Major Gen. Gardiner	Anthony Grayson, Esq.
Benjamin Gault, Esq.	John Green, Esq.
Frederick Geale, Esq.	Molefw. Greene, Esq.
James Gibbons, Esq.	Fran. Wm. Greene, Esq.
Hardinge Giffard, Esq.	Thomas Eves Greene, Esq.
Earl of Glandore	George Grierson, Esq.
Walt. Glascock, Esq.	Richard Griffith, Esq.
William Gore, Esq.	Nicholas Grimshaw, Esq.
Viscount Gosford	John Knox Grogan, Esq.
Earl of Granard	Arthur Guinness, jun. Esq.
Robert Graydon, Esq.	

H

Roger Hall, Esq.	Charles Hamilton, Esq.
Sir John Stewart Hamilton	John Hamilton, Esq.

K

James

James Hamilton, Esq.	Geo. Hepenstall, Esq.
Henry Hamilton, Esq.	R. Town. Herbert, Esq.
Charles Hamilton, jun. Esq.	Hen. Art. Herbert, Esq.
Alexander Hamilton, Esq.	Marquis of Hertford
Hans Hamilton, Esq.	William Hinks, Esq.†
Townly Black. Harman, Esq.	W. Parsons Hoey, Esq.
W. Hartigan, Esq. M. D.	Peter Holmes, Esq.
Edward Haughton, Esq.	Joseph Hone, Esq.
Wm. Haughton, Esq.	Sir Francis Hopkins, Bart.
Viscount Hawarden	Rev. James Horner
John Hayes, Esq.	John Hughes, Esq.
Sir Sam. Hayes, Bart.	William Hume, Esq.
General B. T. Henniker	Ephm. Hutchinson, Esq.
Hugh Henry, Esq.	Hon. F. H. Hutchinson
James Henthorn, Esq.	Hon. L. H. Hutchinson

J

Alexander Jaffray, Esq.	Rev. Hen. Johnston
Geo. Char. Jefferyes, Esq.	Rt. Hon. Theo. Jones
Charles Innes, Esq.	Wm. Jones, Esq.
Sir J. Allen Johnson, Bt.	Geo. D'Arcy Irvine, Esq.
James Johnson, Esq.	William Irvine, Esq.
Robert Johnston, Esq.	

K

Thomas Kane, Esq.	Nich. Wm. Kenny, Esq.
James Kearney, Esq.	Rich. Jervis Kerr, Esq.

Bishop

Bishop of Killaloe, F. R. S.	Richard Kirwan, Esq.
Bishop of Kildare	Rev. Dean Kirwan
Lord Kilmaine	Arthur Knox, Esq.
Bishop of Kilmore	Andrew Knox, Esq.
Ab. Brad. King, Esq.	Hon. Thomas Knox
Wm. Kirkpatrick, Esq.	Hon. George Knox
Edw. Kirwan, Esq.	

L

Earl Landaff	Duke of Leinster, V. P.
Marquis of Lansdown	Charles Leslie, Esq.
Henry Larive, Esq.	H. P. L'Estrange, Esq.
Right Hon. D. La Touche,	Sir Thos. Lighton, Bt.
V. P.	Bishop of Limerick
John La Touche, Esq.	Thomas Lindsay, Esq.
Peter La Touche, Esq.	Lord Lismore
W. D. La Touche, Esq.	John Lloyd, Esq.
Dav. La Touche, jun. Esq.	Richard Lloyd, Esq.
Peter D. La Touche, Esq.	Col. Nicholas Loftus
John La Touche, jun. Esq.	Sir Edward Loftus, Bt.
Geo. La Touche, Esq.	Earl of Londonderry
Walter Laurence, Esq.	Earl of Longford
John Ledaveze, Esq.	Viscount Longueville
John Lees, Esq.	Earl of Louth
William Lehunte, Esq.	Earl of Lucan
John Leigh, Esq. V. P.	William Lyndon, Esq.
Robert Leigh, Esq.	Thomas Lysaght, Esq.

M

Sir John Macartney, Bart.	John Maxwell, Esq.
Gerard Macklin, Esq.	Earl of Meath
John Eyles Madden, Esq.	Sir R. G. Meredyth, Bart.
John Madden, jun. Esq.	Abraham Mills, Esq.
Rand. M'Donnell, Esq.	Humphry Minchin, Esq.
Arthur M'Gwire, Esq. Se- cretary.	Earl of Moira
Walter M'Gwire, Esq.	Hen. Gonne Molony, Esq.
William M'Gwire, Esq.	Lord Monck
Rofs Mahon, Esq.	Alex. Montgomery, Esq.
Edm. Alex. M'Naghten, Esq.	John Montgomery, Esq.
Henry Malone, Esq.	Cha. Carr Morton, Esq.
Col. Orlando Manly	Earl of Mountcashell
George Maquay, Esq.	Earl of Mountnorris
John L. Maquay, Esq.	Charles Mulvany, Esq.
Hon. John Maffey	Sir Rich. Musgrave, Bart.
	Lord Muskerry

N

John Narney, Esq.	John Nixon, Esq.
Sir Wm. Gleadowe Newco- men, Bt. Treasurer.	Lorenzo Nixon, Esq.
Hon. Tho. Newcomen	Ger. Noel Noel, Esq.
Sir Ed. Newenham, Knt.	Lord Norbury
Adam Newman, Esq.	Geo. Lucas Nugent, Esq.
John Nicholson, Esq.	Walter Nugent, Esq.

O

Rev. Wm. O'Connor
 Rt. Hon. George Ogle
 William Ogle, Esq.
 Charles O'Hara, Esq.
 Rt. Hon. Silver Oliver
 Samuel O'Meally, Esq.

Dowel O'Reilly, Esq.
 J. W. O'Reilly, Esq.
 Miles John O'Reilly, Esq.
 Thos. O'Reilly, Esq.
 Viscount Oxmantown

P

Henry Parnell, Esq.
 Jonas Pasley, Esq.
 John Patrick, Esq.
 John Patten, Esq.
 Matthew Pearson, Esq.
 John Pellifer, Esq.
 Rev. J. Pennefather
 Viscount Pery
 Mr. John Phelps
 Joshua Pim, Esq.
 Dillon Pollard, Esq.
 John Pollock, Esq.

A. H. C. Pollock, Esq.
 Hon. and Rev. John Pomeroy
 James Ponsonby, Esq.
 Richard Ponsonby, Esq.
 Joshua Pounden, Esq.
 Richard Power, Esq.
 Viscount Powerscourt
 Rev. Jos. Pratt
 Col. John Pratt
 John Preston, Esq.
 Andrew Price, Esq.
 George Putland, Esq.

R

Thomas Jam. Rawson, Esq.	Ralph Ward Reid, Esq.
Capt. Thomas Read	Richard Reynell, Esq.
Arch. Redford, Esq.	John Richardson, Esq.
Henry S. Reilly, Esq.	Col. Wm. Richardson

Benj.

Benj. Richardson, Esq.
 John Roberts, Esq.
 Sir Boyle Roche, Bart.
 John S. Rochefort, Esq.
 Gustavus Rochfort, Esq.
 John Rochfort, Esq.

Nich. Roe, Esq.
 Alderman John Rose
 Wm. Rowley, Esq.
 Thomas Rutledge, Esq.
 Dr. Richard Ryan

S

Joseph Sabine, Esq.
 Art. French St. George, Esq.
 Major Sandys
 Morley Saunders, Esq.
 Alex. Schawe, Esq.
 Daniel Scully, Esq.
 Earl of Shannon
 Robert Shaw, Esq.
 Sir Geo. Shee, Bart.
 C. F. Sheridan, Esq.
 Mark Singleton, Esq.
 Marquis of Sligo
 Hon. Baron Smith
 Ralph Smith, Esq.
 Rd. Carp. Smith, Esq.
 Wm. Smyth, Esq.
 J. Pred. Smyth, Esq.
 Rev. Dr. Thos. Smyth
 John Smyth, Esq.

Nathaniel Sneyd, Esq.
 Robert B. Sparrow, Esq.
 George Stackpole, Esq.
 Arthur Stanley, Esq.
 John Handc. Stanley, Esq.
 Sir Robert Staples, Bart.
 John Staples, Esq.
 William Stephens, Esq.
 Edward Stephens, Esq.
 Jonas Stevelly, Esq.
 Rev. Hugh Stewart
 Henry Stewart, Esq.
 James Stewart, Esq.
 William Stewart, Esq.
 Rt. Hon. J. Stewart, Att. Gen.
 Hon. Ben. O'Neal Stratford
 Rev. James Symes
 Sir Walter Synnott, Bart.

T

Henry Edw. Taafe, Esq.	Richard Thwaites, Esq.
Rd. Wogan Talbot, Esq.	William Tighe, Esq.
Maj. Gen. Char. Tarrant	Henry Tighe, Esq.
Capt. Alex. Taylor	Thomas Thompson, Esq.
Sam. Taylor, Esq.	Chas. Tottenham, Esq.
Hon. and Rev. Edw. Taylor	Frederick Trench, Esq.
William Thomas, Esq.	Rev. Dr. Truell
Ald. Charles Thorpe	James Baron Tyrawly

U

John Usher, Esq.	Dr. John Usher
D. Hen. C. Usher	

V

Viscount Valentia	John Vernon, Esq.
General Vallancey, V. P.	Rich. Verschoyle, Esq.
Charles Vancouver, Esq.	Viscount De Vesci
Rt. Hon. J. O. Vandeleur	Hon. John Vesey
W. P. Vaughan, Esq.	

W

Robert Wade, Esq.	Hon. Edward Ward
Thos. C. Wakefield, Esq.	Holt Waring, Esq.
Richard Waller, Esq.	Folliot Warren, Esq.
William Walsh, Esq.	Thomas Weaver, Esq.
John Walsh, Esq.	Christm. Weeks, Esq.
John Warburton, Esq.	Isaac Weld, jun. Esq.

Edward

Edward Westby, Esq.	Charles Wood, Esq.
Wm. Westby, Esq.	James Woodmason, Esq.
Henry Westenra, Esq.	Rev. Rich. Woodward
Luke White, Esq.	Henry Woodward, Esq.
Thomas White, Esq.	Mer. Workman, jun. Esq.
Rev. James Whitelaw	Sir Wm. Worthington, Knt.
C. Stone Williams, Esq.	Rev. John Wynne
James Williams, Esq.	Rev. Rich. Wynne.

HONORARY MEMBERS.

The President and Vice-President of the London Society	Christ. Ruetten, Esq.
	Rev. Dr. Blacker
	Mr. J. Warre, of <i>Oporto</i>
The President of the Society in Barbadoes	Sir John Hort, Bart.
	John Arbuthnot, Esq.
Rev. Mr. Bertrand, <i>Berne</i> ,	S. More, Esq. <i>London</i>
Rev. Mr. Chaife, <i>Hague</i> ,	Dr. Robert Perceval
Sir James Jay, M. D.	Mr. Henry Pelham
Dean of Gloucester	Rev. Dr. Beaufort
Mr. Vavasseur, of <i>Rouen</i>	M. L'Abbe Commerel
Mr. Adam Walker	Mr. Jonat. Thompson
Arthur Young, Esq.	Doctor Walter Wade
John Mills, Esq.	Mr. John Long
Rich. Geoghegan, Esq.	Rev. Dr. Maunfell

Sir

Sir John Sinclair, Bart.	J. P. Auriol, Esq. Sec. Royal
Lord Pelham	Institution
Benj. <i>Count</i> Rumford	Rt. Hon. Sir J. Banks, K. B.
Marq. of Buckingham	President of the Royal So-
Earl Camden	ciety
Duke of Rutland	Jos. Planta, Esq. Secretary to
Wm. Morton Pitt, Esq.	the Royal Society
Duke of Argyle	M. Aubin Louis Millin, Keep-
Duke of Norfolk	er of the Museum of Anti-
Lord Carrington	quities at Paris
Rt. Hon. Charles Abbot	Wm. Mathews, Esq. Sec. to
Charles Taylor, Esq.	the Bath Society
Rev. Dr. Lindsay	M. Coquebert De Monbray
Wm. M'Donald, Esq.	Robert Coleman, Esq.
The Earl of Winchelsea and	Rt. Hon. Wm. Wickham
Nottingham, F. A. S. Pre-	Robert Blake, Esq. M. D.
sident of the Royal Insti-	William Warren, Esq.
tution	

COMMITTEE
OF
AGRICULTURE AND BOTANY.

Rt. Hon. John Foster	Sir Wm. Gleadowe Newco-
Rt. Hon. Lord Frankfort	men, Bart.
Rt. Hon. Isaac Corry	Andrew Caldwell, Esq.
Rt. Hon. Earl of Mountnorris	Arthur M'Gwire, Esq.
Rt. Hon. David La Touche	Sir Thomas J. Fitzgerald, Bt.
Thomas Burgh, Esq.	Richard Kirwan, Esq.
John Leigh, Esq.	Richard Reynell, Esq.
General Vallancey	Rev. Dr. Thomas Smyth



COMMITTEE
OF
CHEMISTRY AND MINERALOGY.

Richard Kirwan, Esq.	Hon. John Vesey
Viscount Charleville	John Blachford, Esq.
Hon. George Knox	William Tighe, Esq.

Major

Major Henry Eustace

Isaac Weld, jun. Esq.

Abraham Mills, Esq.

Dowel O'Reilly, Esq.

Henry Hamilton, Esq.

Turner Camac, Esq.

John Boardman, Esq.

Fr. Wm. Greene, Esq.

COMMITTEE

OF

FINE ARTS.

Rt. Hon. John Foster

General Vallancey

Andrew Caldwell, Esq.

Arthur M'Gwire, Esq.

Major Henry Eustace

William Caldbeck, Esq.

Henry Hamilton, Esq.

Richard Power, Esq.

STATISTICAL COMMITTEE.

Rt. Hon. John Foster

Richard Kirwan, Esq.

Arthur M'Gwire, Esq.

Thomas Burgh, Esq.

General Vallancey

BUILDING

BUILDING COMMITTEE.

Rt. Hon. John Foster
Thomas Burgh, Esq.
General Vallancey

Arthur M'Gwire, Esq.
Major Henry Eustace

SECRETARIES.

Arthur M'Gwire, Esq.

Rev. Dr. Thomas Smyth

Assistant Secretary and Register.—Rev. Thomas Lyster,
D. D.

Collector of Members Subscriptions.—Doctor Thomas Lyster.

Professor and Lecturer on Botany and Agriculture.—Walter Wade, M. D.

Professor and Lecturer of Mineralogy and Chemistry.—Wm. Higgins, Esq.

Professor in the Veterinary Art.—Mr. Thomas Peall.

His Assistant.—Mr. George Watts.

Lecturer in Natural and Experimental Philosophy.—Mr. Jas. Lynch.

Master of the Figure School.—Mr. Francis West.

Master of the School for Landscape, Ornament, and Engraving.—Mr. Henry Brocas.

Master of the School for Architecture.—Mr. Henry Aaron Baker.

Housekeepers

Housekeepers to the Repository.—Mr. and Mrs. Walfh.

Head Gardiner at the Botanic Garden.—Mr. John Underwood.

His Assistants.—Mr. John White and Mr. John Jones.

Itinerant Mineralogist.—Mr. Donald Stewart.

Architect and Superintendant of Buildings.—Mr. Edward Parke.

A
DIARY OF THE WEATHER,
AND THE
STATE OF VEGETATION
AT THE
BOTANIC GARDEN
OF THE
DUBLIN SOCIETY,
FOR THE YEAR 1802.

BY
JOHN UNDERWOOD, A.L.S.
HEAD GARDENER AND SUPERINTENDANT.

Dublin:
PRINTED BY GRAISBERRY AND CAMPBELL,
NO. 10, BACK-LANE.
1803.

T.—Thermometer ; is noted at 8 morning, and 12 noon, till the month of May.

Then it is noted at 8 morning, 12 noon, and 4 afternoon the remainder of the year.

In some instances, it is noted at 8 morning, 12 noon, 4 afternoon, 8 at night, and at other hours.

B.—Barometer.

I.—Plants that are Natives of Ireland.

S.—Stove or Hot-house.

G.—Green-house.

☞ The Plants, that have no Letters after them, are hardy, and grow in the open ground.

DIARY OF THE WEATHER.

JANUARY 1802.

Jan.	Ther.	Bar.	Wind.	
1	27 $\frac{1}{2}$ 34	30.1	E. N. E. & W.	Hail and sleet last night; a sharp frost this morning, and a little sunshine, the hail remaining on the ground all day; change about eight at night to rain and sleet.
2	34 36 $\frac{1}{2}$	29.7	N. W.	Frost this morning; some showers of hail, sleet, and snow, about seven at night; and freezing, cloudy all day.
3 aftern. 4 o'clock	20 33 31 $\frac{1}{2}$	30	N. N. E. & E.	Sharp frost this morning; at nine o'clock a shower of hail; between three and four o'clock some sleet and snow, which did not continue long; the air much milder, some sunshine at intervals.
4	23 28	30.2	N. E. S. W. & S.	Frost this morning; little sunshine this day; cold, and evening freezing.
5	29 31	29.8	E. N. E.	Frost this morning; sunshine most part of this day.

<i>Jan.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
6	29 30	29	E. & W.	{ Snow this morning; snowing most part of the day; snow about four inches deep upon the ground.
7	36 40	29.6	S. & S. E.	{ Rain this morning; wind pretty high; cloudy, but fair; thawing, and the most part of the snow gone.
8	38 39	29.6	E.	{ Cloudy this morning; wind high, a little rain in the afternoon; some of the ice still upon the waters.
9	36 37	29.6	E.N.E.	{ Some rain this morning; fleet and snow at times this day; cloudy and cold.
10	31½ 33	29.6	N. E. N.	{ Frost and snow this morning; very little sunshine this day; a great redness round the moon at ten at night.
11	26 33	29.6	N. W.	{ Frost this morning; sunshine, but freezing all day in the shade.
12	22 32 4 o'clock 28½ 8 ditto 22½ 12 night 22	29.6	N. & N. W.	{ A very sharp frost this morning; some snow upon the ground, sunshine most part of this day; but freezing all day.
13	22 32 4 o'clock 27 8 ditto 23	29.8	N. & N. W.	{ About two o'clock this morning the thermometer rose from twenty-two degrees to twenty-nine, in the space of two hours, but a shower of hail come on, and it fell again to twenty-two; sunshine at times, the ice four inches thick.
14	21 30	30	N.W. & W. N. W.	{ Very sharp frost, and sunshine till eleven o'clock; cloudy till three, a little sun after; freezing and a great rime falling.

JANUARY.

7

<i>Jan.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
15	21			The rime, that fell last night, became congealed to the trees and ground, so as to give them the appearance, as if there had been a great fall of snow; some sunshine this day; thawing at 8 this night; frost in the ground seven inches; ice six inches thick.
	28	30.2	N. W.	
	28		&	
11 night	37		W.	
16	38 44	30.2	W.	A fine thaw last night and this morning; a little sunshine, between nine and ten; cloudy; some small rain in the afternoon, which was soon over; wind very high.
17	43 46	29.9	W. S. W. W.	A very fine dry morning, and the frost going without rain; cloudy most part of the day; a high wind from four till late this night.
18	44 45	29.2	W.	A little fine rain early this morning; sunshine, and a very mild day; wind very high at seven this night.
19	50 44½	29.5	W.	High wind last night and this morning, with showers of rain; hail at one o'clock; rain and sunshine at intervals; wind high all day.
20	34 42	29.8	W.	A little frost this morning; cloudy and sunshine at times; very cold, and a high wind.
21	39 40	29.2	W.	Last night the wind was very high; about eleven at night, it encreased to a terrible tempest; from one o'clock this morning, to six, was supposed to be the most dreadful hurricane ever remembered by any of the present age. Trees, houses, corn and hay stacks, were thrown down, and carried away before it; it lasted till three o'clock in the afternoon; frequent showers of hail and rain this day.

<i>Jan.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
22	34 42	30.2	N.N.W.	{ A little frost this morning; mostly sunshine this day, and mild.
23	42½ 47	30.1	S.S.W.	{ Cloudy this morning; afternoon sun- shine; very mild and drying this day.
24	46 50½	30	W.	{ A fine mild morning, with sunshine at intervals; afternoon cloudy, wind pretty high.
25	47 51	30	W.	{ Morning fine, and the ground dry- ing fast; sunshine but little this day; a little rain about one o'clock; cloudy afterwards.
26	49 53	29.8	W. S. W.	{ Wind pretty high with sunshine this morning; cloudy about noon; rain at four o'clock.
27	36 46	30.2	S. & S. E.	{ A little frost, and foggy this morn- ing; sunshine at intervals, but mostly cloudy.
28	52 52	30	S.S.W.	{ Rain last night and this morning, fog and cloudy all day.
29	43½ 46	30	S. & S. W.	{ Much rain last night, or early this morning; rain between eight and nine, a fog at twelve; fog and clouds give way to a fine sun- shine afternoon.
30	41 48	29.8	W. S. W.	{ Frost and high wind this morning; some rain this day.

JANUARY.

9

<i>Jan.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	{	Fine sunshine till two o'clock; cloudy after; very high wind at night.
3 ¹	4 ¹ 48 $\frac{1}{2}$	29.7	S.		
				{	Quantity of rain falling } inches. this month. } 0,682

TREES

TREES AND SHRUBS,

THAT BEGIN TO BUD.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 8, VOL. II, PART II, 1801.

Ulmus Pumila.	Vinca minor et var.
Prunus Padus, <i>v. minor.</i>	—— major.
—— virginiana.	Viburnum sibiricum.
—— caroliniana.	Staphylea trifolia.
—— Lauro-cerasus.	Berberis vulgaris, <i>alba.</i>
—— <i>fol. aur.</i>	Vaccinium venustum.
—— Cerasus, <i>arm. pen.</i>	Laurus nobilis, <i>fol. var.</i>
—— <i>fl. plen.</i>	Rhododendron punctatum.
—— avium.	Aristotelia Macqui.
—— domestica, <i>fol. aur.</i>	Amygdalus pumila.
Tilia Europea, <i>v. corallina.</i>	Cratægus Aria.
—— <i>v. parvifolia.</i>	—— <i>v. fol. var.</i>
Quercus Robur. <i>v. fol. arg.</i>	—— Crus-galli, <i>salicifol.</i>
Pinus Tæda.	—— Oxyacanthus, <i>fl. rub.</i>
—— <i>v. alopecur.</i>	Pyrus angustifolia.
Taxus baccata.	Spiræa lævigata.
—— nucifera.	—— hypericifolia.
Acer montana.	Rosa pimpinellifolia.
Olea americana.	—— spinosissima, <i>fl. rub.</i>
Ilex Aquifolium, <i>fruct. flav.</i>	—— <i>v. spiral.</i>
—— <i>v. ferox.</i>	Rubus Idæus, <i>alba.</i>
Lonicera Caprifolium.	—— occidentalis.
Lycium barbarum, <i>chinense.</i>	—— fruticosus, <i>alba.</i>

Rubus

JANUARY.

11

Rubus fruticosus, v. <i>inermis</i> .	Salix amygdalina.
————— v. <i>laciniat</i> .	—— glauca.
Thymus Serpyllum.	—— myrsinitis.
————— v. <i>citri-odore</i> .	—— lanata.
————— vulgaris.	—— lapponum.
Spartium junceum.	—— Capræa <i>foem</i> ,
————— v. <i>fl. pleno</i> .	—— cinerea.
Robinia Chamlagu.	—— tristis.
Othonna cheirifolia.	—— variegata.
Buxus sempervirens, <i>fol. arg.</i>	—— septentrionalis.
Corylus Columna.	—— pensylvanica,
Salix hermaphrodita.	Myrica cerifera.
—— triandra.	Pistacia Terebinthus,
—— pentandra.	Juniperus Oxycedra.
—— vitellina.	Ruscus aculeatus.

FEBRUARY

FEBRUARY 1802.

<i>Feb.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
1	40 $\frac{1}{2}$ 44	29.2	S.S.W.	{ Very high wind with rain early this morning; sunshine the most part of this day.
2	35 $\frac{1}{2}$ 42	29.5	W.	{ Frost this morning; sky clear, and fine sunshine till four o'clock; cloudy after and cold; a little frost the forepart of the night.
3	41 43	29.4 29.5	W.	{ Frost changed to rain this morning; cloudy till one o'clock, sunshine after, wind very high.
4	42 41	29.1	S.S.W. & S.	{ Very high wind last night and this morning, with some rain; a great storm all day with showers of rain at intervals.
5	35 40	29.9	S.W.	{ Storm ceased about ten last night; a sharp frost this morning; a little rain between nine and ten, sunshine till three, rain after and cold.
6	43 42 4 o'clock 41 8 night 35	29.3 29.5	W. N.	{ Cloudy and misty; very calm with some missing rain between eight and nine this morning; sunshine and high wind at noon; sunshine all the afternoon, with a sharp wind.

<i>Feb.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
7	31 40	31	N. W.	{ A frost last night and this morning ; a fine mild day with sunshine ; evening a fog ; at six a halo round the moon.
8	42 46	29.7	S.S. W. & N.N.W.	{ High wind and rain early this morn- ing, and continued till one o'clock ; sunshine and cloudy at intervals the afternoon ; a fine clear moon- light this night.
9	33 41½	29.7	W.	{ A sharp frost last night and this morning ; sunshine till one o'clock ; cloudy, and a shower of sleet at two, sunshine and cloudy after ; a shower of sleet at eight this evening ; wind very sharp all day.
4	37½		S. W.	
8	33			
10	33 37½	29.5	W. N.N.W.	{ A sharp west wind, and the ground lightly covered with snow this morning ; at eight and nine, show- ers of snow ; wind shifting to N. N. W. about noon ; sunshine and clouds at intervals ; wind very high at nine and ten this night, and freezing.
11	33 37	29.8	N. W. N.	{ Frost this morning, and sunshine ; a sharp wind but not high, between three and four afternoon a shower of sleet ; cloudy and freezing this night.
12	31 39	30.1	N. W. S.S. W. W.	{ Frost and sunshine this morning ; afternoon cloudy and sunshine at times ; very calm ; the wind va- ried much this day ; clear moon- light, and freezing this night.
8 n.	29		N. E.	
13	26½ 39	30.3	N. N.E. E.N. E.	{ A very sharp frost this morning ; sunshine most part of this day ; cloudy towards evening ; a little mistling rain about eight this night.

<i>Feb.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
14	34½ 39	30.2	N.N.E. S. E. E.	{ A little frost early this morning; sunshine at intervals, misty towards evening; a circle round the moon between nine and ten this night.
15	34 40	29.8	S.S.W. N. W. W.	{ The ground covered with snow this morning; a little rain from eleven to two; misty the afternoon; cleared up about nine at night, and freezing.
16	34 42	29.6	N. W. W.	{ Rain and sleet took place after the frost of last night; rain between six and seven, and a little sunshine between eight and nine this morning; rain at one, sunshine between two and three, a full rainbow at three, showers after, a circle round the moon at eight o'clock this night.
17	41 49	29.1	W. S.W.	{ Rain last night and this morning till nine; some sunshine, a shower of rain at one, a shower of hail between two and three, a heavy shower of rain at four, sunshine and part of a rainbow to be seen, rain soon after.
18	41 44½ 8 D. 33	29.2	N.W. N.	{ Rain this morning till near nine; cloudy till noon, sunshine afternoon; freezing, and a halo round the moon between ten and eleven at night.
19	42 51	29.3	S. N.W. W.	{ Rain till towards noon; sun just appearing about one, showers of rain till night, cleared, and fine moonlight after seven at night, wind high.

<i>Feb.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
20	42 48	29.4	W. N.N.W.	{ A pretty high wind ; cold ; but sunshine this morning, and till two ; afterwards small rain to six, heavy rain till ten, and afterwards this night.
21	47 51½	29.4	W.	{ Much rain last night and early this morning ; small rain most part of this day, and very mild ; wind pretty high.
22	53 55½	29.7	W. N. W.	{ Small rain at times this morning till nine ; wind high, and cloudy till two, rain afterwards.
23	51 54	30	W. N. W.	{ Dark, and small rain at times, the most part of this day ; wind pretty high all day.
24	48 52	29.9	N.N.W. S.W. W. W.N.W.	{ Rain early this morning ; small showers of rain at times, a rainbow at half after eleven, and another rainbow twenty minutes before one o'clock ; heavy rain about two, which lasted about two hours, with the wind remarkably high ; evening cold but dry.
25	39½ 46	30	N. N. E.	{ A fine morning, sunshine most part of the day ; ground drying fast ; wind pretty high all day ; evening calm.
26	40 48	30.1	W. N. W.	{ Cloudy this morning, and most part of the day ; night clear.
27	44 50	30	W.	{ Some small rain at times this day, with very little sun ; missing rain at eight this night ; wind very cold.

28 41 29.6 S. W. { A light frost, with sunshine this
48 W. { morning; cloudy and dark the
rest of the day.

Quantity of rain falling } inches
this month. } 1.145

TREES

TREES AND SHRUBS,

THAT BUD IN FEBRUARY.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 14, VOL. II, PART II, 1801.

Æsculus Hippocastanum, <i>fol. arg.</i>	Cornus florida, <i>fol. aur.</i>
Petula papyracea.	———— fanguinea, <i>fol. aur.</i>
Quercus Phellos.	———— alternifolia.
———— <i>v. sericea.</i>	———— <i>v. virescens.</i>
———— gramuntia.	Ilex vomitoria.
———— coccifera.	Solanum Dulcamara.
———— virens.	———— <i>v. fol. arg.</i>
———— aquatica.	Rhamnus infectorius.
———— <i>v. heteroph.</i>	———— saxatilis.
———— <i>v. elong.</i>	———— Frangula.
———— nigra.	———— Alaternus.
———— discolor.	———— <i>v. fol. arg.</i>
———— alba.	———— <i>v. fol. aur.</i>
———— Robur, <i>fol. peren.</i>	———— Paliurus.
———— Cerris, <i>fol. peren.</i>	Hedera Helix, <i>fol. arg.</i>
Salisburia adiantifolia.	———— <i>v. fol. arg.</i>
Pinus Tæda, <i>rigida.</i>	Rhus Typhinus.
———— Strobis.	———— Vernix.
Jasminum officinale, <i>fol. aur.</i>	Viburnum Tinus.
———— <i>v. fol. arg.</i>	———— <i>v. lucidum.</i>
Salvia cretica.	———— <i>v. virgatum.</i>
———— officinalis, <i>fol. aur.</i>	———— <i>v. striata.</i>

c

Viburnum

Viburnum Tinus, <i>v. fol. aur.</i>	Phlomis fruticosa <i>v. latifolia.</i>
Tamarix gallica.	Vitex Agnus Castus.
—— germanica.	—— <i>v. latifolia.</i>
Cratægus sanguineus.	Genista triquetra,
—— tanacetifolius.	Cytisus capitatus.
Mespilus Germanica, <i>diffusa.</i>	—— purpureus.
—— Malus, <i>fol. varieg.</i>	Robinia Altagana.
Rosa lutea, <i>v. bicolor.</i>	Lotus hirsutus.
Calycanthus floridus, <i>v. ovatus.</i>	Hypericum prolificum.
Phlomis fruticosa.	

 SHRUBS,

THAT PUT FORTH THEIR LEAVES IN

 FEBRUARY.



 CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
 PAGE 17, VOL. II, PART II, 1801.

 Hypericum hircinum *minus.*
 —— prolificum.

MARCH

MARCH 1802.

<i>March</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
1	32 47	29.6	W.	{ White frost this morning ; fine sunshine and drying wind all day.
2	42 44	29.3	W. S. E N. W.	{ Cloudy this morning ; some small misting rain at times this forenoon ; sunshine at two ; misting rain at three ; part of a rainbow to be seen ; changed to heavy rain till five ; fine after.
3	34 43	29.5	W. N. W.	{ A little frost this morning ; sunshine at times, a shower of hail at four, clear and freezing in the evening.
4	31 45	29.8	N. W. N. W.	{ Frost this morning ; sunshine most part of the day ; at two o'clock a few drops of rain, and then hail for a few minutes ; fine after, and freezing at night.
5	28 39	30.2	N. W S. W. W. N. E.	{ A sharp white frost this morning ; a fine clear sunshine day, freezing at night.
6	33 42	30.1	N. E. W. S. W.	{ Frost and cloudy this morning ; sunshine the forenoon, dark and cloudy after ; a few drops of rain at five o'clock, evening fair but cloudy.

March

<i>March</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
7	44 51	30	W. S. W.	{ A fine morning ; sunshine most part of the day ; wind very drying to day ; a little missing rain at nine this night.
8	42 45	29.7	W. N. W. & by N.	{ Dark and misty this morning ; cloudy and sunshine at times, wind pretty high, freezing at night.
9	32 44	30.2	W. N. W.	{ A white frost this morning ; cloudy and sunshine at times this day ; missing rain at four and six, evening fine ; moonlight at eight night.
10	47 53	30.2	N. W. W.	{ A fine dew this morning ; wind pretty high, mostly sunshine this day.
11	47 54	30.1	W.	{ Cloudy but dry this morning ; sunshine till noon, cloudy afterwards ; a little missing rain at eight this night.
12	42 47	29.9	N. W.	{ Rain last night, cloudy and showers this morning ; hail, sunshine about eleven, and part of a rainbow to be seen ; showers of hail, sleet and rain at times this day ; freezing at night.
13	35 40	30.2	N. W. N.	{ A little frost, and sunshine this morning ; wind high, showers of hail, rain, and snow ; sunshine towards evening, wind very sharp.
14	36 41	30.3	N N. W.	{ Some frost this morning ; sunshine most part of the day ; wind sharp, and freezing this night.
15	32 $\frac{1}{2}$ 42 $\frac{1}{2}$	30.4	N. W. N.	{ Frost this morning ; sunshine most part of the day ; rain between eight and nine at night.

March

March	Ther.	Bar.	Wind.	{	A white frost this morning ; sunshine the most of the forenoon, afternoon cloudy.
16	36 48½	30.4	W.S.W. N. W.		
17	45 51½	30.4	N.N.W. & W.	{	Cloudy all this day ; could just see the sun appearing at times ; the wind sharp.
18	47 51 58 48	30.2 30	W.		
19	46 53½	29.5	W. N.N.W. S. W.	{	Cloudy this morning ; sunshine, high wind, and cloudy ; rain, sleet, and snow, at eight this night ; the wind very high all day.
20	35 46	29.5	W. S. W.		
21	46 50	29.1	W. N. W.	{	The ground covered with snow, and sunshine this morning ; wind pretty high, cloudy and sunshine at intervals this day.
22	40½ 44½	29.2	W. N.N.W.		
23	40 48½	29.9	W.	{	Very high wind, and heavy showers of rain till noon ; cloudy and sunshine afternoon.
24	51 56	30.1	W.		
25	59 60	30.3	W.	{	Heavy showers of rain and hail with some sunshine at intervals ; wind very high this day.
				{	Cloudy, and a little sunshine at times, light rain about noon, cloudy and rain at night.
				{	Rain last night, missing rain this morning ; and till noon mild and sunshine ; cloudy and dark after.
				{	Cloudy and mild this morning ; sunshine about ten, and afterwards a fine mild day.

<i>March</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
26	50 55	30.4	W. E.	{ A fine dew this morning ; sunshine most part of the day, a little cloudy towards evening.
27	50 60	30.3	E. N. W. W.	{ A very heavy dew, and fine sunshine this morning ; a beautiful sunshine and warm day.
28	50 57	30.2	S. W, W. N. N. W. N.	{ Cloudy this morning ; missing rain towards noon, sunshine about one, showers and cloudy after ; wind very variable this day, changed into the different points in about ten minutes.
29	40 $\frac{1}{2}$ 45 $\frac{1}{2}$	30.4	N. W. N.	{ High wind and cloudy, with showers of hail at times this day ; night very clear, many stars to be seen.
30	42 48	30.4	N. N. E.	{ A white frost this morning ; sunshine till noon, afternoon cloudy.
31	49 59 $\frac{1}{2}$	30.4	W. N. W.	{ Cloudy this morning ; cloudy and sunshine at intervals this day.

Quantity of rain falling } inches.
this month. } 1,136

TREES

TREES AND SHRUBS,

THAT BUD IN

MARCH.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 22, VOL. II. PART II. 1801.

Yucca gloriosa.	Ruta graveolens.
— Draconis.	Rhododendron maximum.
— filamentosa.	Phlomis purpurea.



TREES AND SHRUBS,

THAT PUT FORTH THEIR LEAVES IN

MARCH.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 24, VOL. II, PART II, 1801.

Jasminum fruticans, fol. aur.	Syringa Persica, v. laciniata.
— officinale, fol. aur.	Viburnum Opulus, americanum.
Ligustrum vulgare, fol. aur.	Amygdalus Persica, glabra.
— — v. fol. arg.	— — fl. pleno.
Syringa vulgaris, violacea.	— — communis, amara.
— — v. alba.	— — v. chinense.
— — v. ameri.	— — orientalis.
— Persica, alba.	Rosa arvensis.

Rosa

Rosa arvensis, <i>fol. varieg.</i>	Rosa centifolia, <i>v. lisbon.</i>
—— carolina, <i>pleno.</i>	—— rubiginosa, <i>Mossy plen.</i>
—— — <i>v. patula.</i>	—— — <i>v. Marb. plen.</i>
—— provincialis, <i>v. chil.</i>	—— alpina, <i>rub.</i>
—— centifolia, <i>v. sing.</i>	—— alba, <i>pleno.</i>
—— — <i>v. sing. velvet.</i>	—— — <i>v. clustered.</i>



PLANTS

THAT FLOWER IN

MARCH.



CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 25, VOL. II, PART II, 1801.

Iris tuberosa.	Erica lateralis —G.
Cyperus alternifolius.—S.	—— phytodes.—G.
Cynoglossum Omphaloides.	—— petiolata.—G.
Pulmonaria virginica.	—— viscaria.—G.
Lonicera nigra.	—— flexuosa.—G.
Diosma hirsuta.—G.	—— costata.—G.
Crassula odoratissima.—G.	Cardamine trifolia.
Zanthorhiza apiifolia.	Arabis alpina.
Narcissus Tazetta.	Glycine coccinea.—G.
Ornithogalum luteum.	Tussilago palmata.
—— — caudatum.—G.	Cineraria Amelloides.—G.
	Cineraria

MARCH.

25

Cineraria cruenta.—G.
Carex clandestina.
Parietaria arborea.—G.
Mimosa verticillata.—G.
—— ensifolia.—G.

Mimosa myrtifolia.—G.
—— suaveolens.—G.
Equisetum arvense.—I.
Polypodium aureum.—S.
—— trifoliatum.—S.

APRIL.

APRIL 1802.

<i>April</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
1	50 52½	30.2	N.W. E.	{ Cloudy, and a little rain this morning, sunshine till noon, cloudy afterwards.
2	48 52	29.7	S.W. E.	{ A very fine morning; sunshine most part of the day, cloudy towards evening.
3	46 49	29.8	E.	{ Cloudy this morning; sunshine and cloudy at times, a very fine day.
4	42 55	29.7	E. W. S.W.	{ A little frost this morning, and sunshine till noon; cloudy and the wind pretty high.
5	40½ 53½	29.8	W. N.W.	{ Rain last night or early this morning; sunshine till towards noon, cloudy, and the wind pretty sharp in the afternoon.
6	43 57	30.2	N.W. W.	{ A light frost this morning; a fine sunshine day.
7	51 57	30.2	W.	{ Cloudy this morning; a little sunshine towards noon, missing rain between one and two, cloudy and dull after, wind pretty high all day.
8	55½ 59	30.	W. N.W. N.	{ Cloudy and rain from eight this morning till two afternoon; sunshine at times till evening, and the wind, being strong all day, became calm in the evening.

<i>April</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
9	48 55½	29.9	W. N.N.W.	{ Cloudy and rain at times this morning ; showers of rain and hail, with sunshine at various times this day ; part of a rainbow at five o'clock.
10	48 50	29.9	W.	{ Cloudy, with a cold wind this morning ; rain from ten till between two and three ; sunshine, and a heavy shower ; sunshine at intervals till evening.
11	43 46	29.7	W. N. W.	{ High wind and sunshine this morning ; hail and rain between nine and ten ; wind very strong, with heavy showers of hail and rain this day.
12	37½ 45½	29.8	W. N. W. N.	{ Ground covered with snow, and a little frost this morning ; sunshine and showers of snow at times this day, wind very cold ; the moon very bright this night.
13	39½ 49	30.2	N. E.N.E.	{ A white frost this morning ; sunshine till three, hail and rain, sunshine and mild towards evening.
14	44 53	31	N. E. W.	{ Fine rain till nine this morning ; cloudy with a brisk wind ; showers with some sunshine in the afternoon.
15	50 53	29.9	W. S. W.	{ Cloudy, with the wind pretty high this morning ; dull and misting rain at times, very little sunshine this day.
16	47 59	29.9	N. W. W.	{ A fine dew with some mist, a little rain and sunshine about eight this morning ; sunshine all the forenoon, afternoon cloudy, rain at seven this night.

April	Ther.	Bar.	Wind	
17	56 58½	30.1	W. N. W.	Misling rain at six, sunshine till eight this morning; cloudy till four, sunshine till evening; calm and moon bright this night.
18	56½ 66	30.2	W.	Misling rain at times this morning; cloudy and sunshine at intervals, calm, and very mild this day.
19	58 67	30.2	W.	A fine mist early this morning, sunshine and clouds at times, a fine warm day, a little misling rain towards evening.
20	54 53	30.2	E.	Rain this morning; cloudy till two, sunshine and cloudy at times.
21	47½ 61	30.2	E. W.	A very heavy dew (almost a frost) this morning; fine sunshine till noon, cloudy and a little rain towards evening.
22	54 58	29.8	W.	Rain in the night, and early this morning; the wind pretty high, showers and sunshine at intervals this day, part of a rainbow at six; rain and calm at night.
23	48 53	30.1	N. N. N. W.	Wind very high, with some sunshine this morning; a fine day, but cloudy.
24	53 58	30 29.9	W.	Wind high, cloudy, and rain at times this morning; cloudy, sunshine, and showers at intervals this day; calm towards night.
25	52 55	29.7	W.	High wind and rain this morning; sunshine at times, and heavy showers of hail and rain this day, a rainbow at four o'clock.
26	50 52	29.7	W.	High wind, cloudy with sunshine at times this morning; about noon rain, and very high wind till towards night; at night calm.
4		29.3	S. W.	

<i>April</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
27	45 50	29.5	W. N. W.	{ Calm, sunshine, and heavy dew this morning ; cloudy and showers of hail and rain at times this day.
28	44 45	29.9	N. E.	{ A white frost and sunshine this morning ; a little hail and rain to- wards noon, at one o'clock it be- gan to thunder, a remarkable shower of very large hail, several loud claps of thunder till five, sun- shine ; night freezing.
29	47 51	30.2	E. S. E.	{ Fine sunshine and very little frost this morning ; a fine day ; the Cu- culus canorus, or cuckoo, heard this morning.
30 4	49 57 59	30.3	E.	{ A fine dew and sunshine this morn- ing ; a very fine day, mostly sun- shine.

Quantity of rain falling } inches,
this month. } ,86

TREES

TREES AND SHRUBS,

THAT PUT FORTH THEIR LEAVES

IN APRIL.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 32, VOL. II, PART II, 1801.

Phillyrea latifolia <i>v. levis.</i>	Azalea viscosa, <i>v. fissa.</i>
————— <i>v. obliqua.</i>	————— <i>v. floribunda.</i>
Olea americana.	————— <i>v. glauca.</i>
——— europæa.	Lonicera dioica.
Chionanthus virginica.	————— nigra.
————— <i>v. angustifolia.</i>	————— Symphoricarpos.
Cornus florida, <i>fol. aur.</i>	Solanum Dulcamara, <i>fol. aur.</i>
——— Sanguinea, <i>fol. aur.</i>	Ceanothus americanus.
Ilex Perado.	Rhamnus latifolius.
Ulmus campestris, <i>fol. aur.</i>	Euonymus europæus, <i>fruct. albo.</i>
————— <i>v. stricta.</i>	————— <i>fruct. pallid.</i>
————— <i>v. glabra.</i>	————— atropurpurea.
————— americana, <i>alba.</i>	Viburnum Tinus, <i>hirtum.</i>
————— pumila.	————— <i>v. virgatum.</i>
Æsculus Hippo-castanum, <i>fol.</i>	————— <i>v. fol. arg.</i>
<i>aur.</i>	————— Lantana, <i>grandifol.</i>
Azalea nudiflora, <i>v. carnea,</i>	Vaccinium frondosum.
————— <i>v. bicolor.</i>	————— amœnum.
————— <i>v. papilio.</i>	Prunus Padus.
————— <i>v. phœnicea.</i>	————— <i>v. minor.</i>

Cratægus

Cratægus intermedia.	Salix hermaphroditica.
—— punctatus, <i>fruct. aur.</i>	—— <i>babylonica.</i>
—— Crus-galli, <i>salicifol.</i>	—— <i>rubra.</i>
—— Oxyacantha, <i>flor. pleno.</i>	—— <i>myrsinitis.</i>
—— ———— <i>flor. rubro.</i>	—— <i>argentea.</i>
—— ———— <i>fruct. flavo.</i>	—— <i>capræa.</i>
Mespilus germanica, <i>diffusa.</i>	—— <i>viminalis.</i>
Prunus sibirica.	—— <i>acuminata.</i>
—— <i>baccata.</i>	Acer tataricum.
Tilia europæa, <i>corallina.</i>	—— <i>Pseudo-Platanus, fol. aur.</i>
—— <i>americana.</i>	—— <i>rubrum, pallidum.</i>
—— <i>alba.</i>	—— <i>Opalus.</i>
Bignonia Catalpa.	—— <i>monspeffulanum.</i>
Cytisus Laburnum, <i>fol. aur.</i>	Betula alba, <i>pendula.</i>
—— <i>alpinum.</i>	—— <i>populifolia.</i>
—— <i>hirsutus.</i>	—— <i>excelsa.</i>
—— <i>capitatus.</i>	—— <i>Alnus.</i>
Buxus sempervirens.	—— ———— <i>v. pinnatif.</i>
—— ———— <i>v. lanceolata.</i>	—— <i>Sibirica.</i>
—— ———— <i>fol. argent.</i>	Fagus sylvatica, <i>cuprifol.</i>
—— <i>humilis.</i>	Carpinus Betulus, <i>incisa.</i>
Corylus Avellana, <i>grandis.</i>	—— ———— <i>v. quercif.</i>
—— ———— <i>v. rubra.</i>	

PLANTS,

THAT FLOWER IN

APRIL.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 35, VOL. II, PART II, 1801.

Salvia violacea.—S.
Iris lutescens.
Primula villosa.
—— integrifolia.
Phlox pilosa.
Rhamnus Frangula.
Ribes procumbens.
—— diacantha.
—— oxyacanthoides.
Gentiana verna.—I.
Narcissus triandrus.
Amaryllis vittata.—S.
Allium triquetrum.
Tulipa sylvestris.
—— gesneriana.
Lachenalia tricolor.—G.
Erica scoparia.—G.
—— Petiveriana.—G.
—— Melastoma.—G.
—— Plukenetii.—G.
—— purpurea.—G.

Erica daphnæflora.—G.
—— fordida.—G.
Anagyris foetida.
Saxifraga palmata.
—— hypnoides.—I.
Oxalis incarnata.—G.
Asarum canadense.
—— virginicum.
Aristotelia Macqui.
Pyrus Pollveria.
Spiræa crenata.
Fragaria grandiflorum.
—— chilensis.
Fothergilla alnifolia.
Delphinium Staphisagria.
Teucrium Abutiloides.—G.
Lantana Camara.—S.
—— aculeata.—S.
Lepidium petræum.
Alyssum sinuatum.
Hesperis tristis.

D

Erodium

<i>Erodium bimaculatum.</i>	<i>Indigofera amoena.</i> —G.
<i>Pelargonium punctatum.</i> —G.	<i>Aster fruticosus.</i> —G.
————— <i>adulterinum.</i> —G.	<i>Arctotis acaulis.</i> —G.
————— <i>Saniculifolium.</i> —G.	<i>Othonna denticulata.</i> —G.
<i>Anthyllis Cytifoides.</i> —G.	<i>Arum tenuifolium.</i>
————— <i>hermanix.</i> —G.	<i>Cupressus Thyroides.</i>
<i>Robinia Caragana.</i>	<i>Empetrum nigrum.</i>
————— <i>spinosa.</i>	<i>Populus tremula.</i>
————— <i>frutescens.</i>	————— <i>nigra.</i>
————— <i>pygmæa.</i>	————— <i>balsamifera.</i>
<i>Hippocrepis comosa.</i>	<i>Equisetum sylvaticum.</i> —I.

M A Y 1802.

May.	Ther.	Bar.	Wind.	
1	56 54	30.3	E.	{ A heavy dew (almost a frost) this morning ; a fine sunshine day.
2	61 57	30.2	E. S. E.	{ A fine dew this morning, and sunshine day till about four ; cloudy after.
3	53 51	30.2	E.	{ A little misting rain this morning ; cloudy and dull ; a little sunshine towards evening ; air very cold ; night clear at nine.
4	58 52	30.3	E.	{ A very fine sunshine day.
5	58 $\frac{1}{2}$ 62	30.3	E.	{ A fine dew (almost a frost) this morning ; sunshine till noon, cloudy till four, sunshine after, misty at eight, moonlight at nine.
6	59 53	30.3	E.	{ A fine dew, cloudy and misty this morning and till two ; fine sunshine after, misty at nine this night.

<i>May.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
7	55 51	30.3	E.	{ A heavy dew and sunshine till noon; cloudy after, and a very thick fog at night.
8	63 58	30	E. S. E.	{ A heavy dew and thick fog at eight this morning; cloudy and sunshine at intervals this day, missing rain at nine and ten at night.
9	62 56	30	E. N. W.	{ A fine sunshine morning; cloudy at intervals this day.
10	56 52	30.2	N. W.N.W.	{ A little dew and sunshine this morning; cloudy the most part of the day after, air very cold at nine this night.
11	55 56	30.1	N. W. & W.	{ Cloudy till three; a little sunshine, and dark after, a few drops of rain at eight this evening.
12	57 55	30	N.E.	{ Some small rain this morning; cloudy and some sunshine at times this day, missing rain at nine this night.
13	44 49 48 44	30.1	E. N.	{ High wind, sunshine and cloudy this day; moonlight and calm at nine this night.
14	40 50 44 42	30.1	N. N. W. E.	{ A very severe frost, sharp air with sunshine this morning; ice as thick as a shilling on the water; some snow at noon, heavy showers of hail between three and four, then sunshine; rain and sleet between nine and ten at night.

<i>May.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
15	42		N. W.	{ Cloudy, sunshine from eight to ten, cloudy, and light showers of hail; at eleven the thermometer was as high as fifty-two, it fell eight degrees in the space of half an hour; at twelve a very heavy shower of hail; sunshine and showers of hail till four; from four to five nothing but hail as fast as it could pelt; about ten minutes after five part of a rainbow, and sunshine at intervals; moonlight at nine at night.
	44	30	E.	
	38		S. W.	
	37		N. W.	
at the close of night.	32			
16	37		N.	{ A very sharp frost, with some snow on the ground; ice about the thickness of a dollar; sunshine till eleven; cloudy and showers of hail, a heavy shower of sleet at four, dark and cloudy after; the Dublin mountains covered with snow; wind cold and variable this day. For the destruction done to vegetation by the frost. See below immediately after the month of December.
	48	30	E.	
	44		N.	
17	40		N. E.	{ A sharp frost with ice on the water, and sunshine this morning; after ten cloudy, showers of hail, and sleet, rain about five, hail and sleet, cold and appearing for frost.
	52	30	N. W.	
	46		N.	
18	42		N.	{ Frost, and ice on the water, sunshine till noon, afternoon cloudy, wind very keen, and cold for the season; the wind varied very much this day.
	50	30	N. W.	
	47		E.	
			N. E.	
			S. E.	
			E.	
19	53	29.7	N. E.	{ A little frost, wind very sharp, sunshine till noon; cloudy and sunshine at times this day; evening more mild with a kind of mist falling, looking as if it would freeze at nine.
	50			

<i>May.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
20	48 44	29.9	N. N. E. E.	{ Very little frost, but wind very high, and cold sharp rain at times; rain mostly from ten to five; clear and calm at nine this night.
21 at 8	60 63 68	29.8	W. N. N. E.	{ Some rain early this morning; wind pretty high but very soft, with clouds and sunshine at times this day; very warm at nine this night.
22	70 68	29.9	N. N. E.	{ Dull but mild; a glimpse of the sun between two and three; cloudy after.
23	58 57	29.9	N. E. E.	{ Cloudy this morning; a little rain from eleven to three; dull but fair after.
24	66 63	30	E.	{ A fine dew, and sunshine this morning; sunshine all day; wind pretty high all day.
25	63 63	30	E.	{ Sunshine the most part of this day; wind pretty high, a fine clear night.
26	62 63	29.9 $\frac{1}{2}$	E.	{ Fine sunshine till noon, wind pretty high, cloudy in the afternoon; a little rain about five, and between six and seven; a fine clear calm night.
27	63 67	29.9 $\frac{1}{2}$	N. E. S. E. E.	{ A fine sunshine day, with fine light wind, varying frequently from one point to another.
28	62 58	29.8	E.	{ Sunshine till ten, cloudy with a little missing rain; a fine shower of rain at two and three, light showers after; fine missing rain at nine at night.

<i>May.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	{	Cloudy, missing rain most part of this day; a thick fog which turned to small rain about seven; pretty heavy about eight this night.
29	58 60	29.4 $\frac{1}{2}$	E.		
			S. W. E.		

30	48 48 $\frac{1}{2}$	29.6	N. E.	{	Rain this morning; cloudy with the wind pretty high; a little sunshine about noon; afternoon cloudy and cold; sky clear and cold at nine this night.
			E.		

31	51 51	29.9	N. E.	{	Sunshine and very high wind this morning; cloudy and sunshine at intervals this day; at ten night, mild but cloudy.
			E.		

Quantity of rain	{	Inches
falling this month.		0.75

TREES

TREES AND SHRUBS,

THAT PUT FORTH THEIR LEAVES

IN MAY.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,

PAGE 42, VOL. II, PART II, 1801.

Ilex Cassine.

——— *v. angustifolia.*

Vitis vinifera.

Vitis laciniosa.

——— *hederacea.*

PLANTS,

THAT FLOWER IN

MAY.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,

PAGE 43, VOL. II, PART II, 1801.

Phillyrea media.

——— *angustifolia.*——— *latifolia.*

Justicia nitida.—S.

Salvia mexicana.—G.

——— *aurea.*—G.——— *Æthiops.*

Valeriana cornucopiæ.

Ixia

Ixia rubro-cyana.—G.
 — *spicata.*—G.
 — *erecta.*—G.
 — *crocata.*—G.
Gladiolus tristis.—G.
 ——— *Merianus.*—G.
 ——— *plicatus.*—G.
Antholyza Cunonia.
Lygeum spartum.
Sagina apetala.—I.
Anchusa angustifolia.
Symphytum patens.
 ——— *tuberosum.*
Hydrophyllum virginicum.
 ——— *canadense.*
Lyfimachia thyrsiflora.—I
Campanula perfoliata.
Rhamnus catharticus.
 ——— *alnifolius.*
LasERPitium trilobum.
Piminella dioica.—I.
Statice cephalotis.
Crassula cordata.—G.
Narcissus orientalis.
Amaryllis Atamasco.
 ——— *formosissima.*—S.
 ——— *reginæ.*—S.
Albuca major.—G.
 ——— *minor.*—G.
Hyacinthus romanus.
 ——— *comosus.*
Erica urceolaris.—G.
 — *planifolia.*—G.
 — *Patterfonia.*—G.
 — *empetrioides.*—G.

Erica calycina.—G.
 — *Bruniades.*—G.
 — *cubica.*—G.
Daphne alpina.
Gnidia oppositifolia.—G.
Saxifraga Cotyledon.
 ——— *ligulata.*
 ——— *rosularis.*
 ——— *Aizoon.*
*Saponaria ocymoides.*¹
Cucubalus italicus.
Sedum hybridum.
Oxalis violacea.
 — *corniculata.*
Afarum europeum.
Bocconia cordata.—G.
Reseda alba.
Euphorbia palustris.
Metrosideros lanceolatus.—G.
Prunus rubra.
 ——— *pumila.*
Cratægus cordata.
 ——— *flava.*
 ——— *parvifolia.*
 ——— *Crus-galli.*
Geum strictum.
 — *montanum.*
Cistus populifolius.
 — *marifolius.*
 — *anglicus.*
Thalictrum foetidum.
 ——— *cornuti.*
 ——— *majus.*
 ——— *simplex.*
Ranunculus illyricus.

Ranunculus

- | | |
|--------------------------------------|------------------------------------|
| <i>Ranunculus rutæfolius</i> ; | <i>Geranium purpureum</i> . |
| <i>Lavandula Stœchas</i> .—G. | <i>Fumaria spicata</i> . |
| <i>Stachys circinata</i> . | <i>Spartium multiflorum</i> . |
| <i>Leonurus sibiricus</i> . | <i>Ononis Natrix</i> .—G. |
| <i>Lantana involucrata</i> .—S. | <i>Arachis hypogæa</i> .—S. |
| <i>Linnæa borealis</i> . | <i>Astragalus Tragacantha</i> . |
| <i>Melianthus major</i> .—G. | <i>Calendula graminifolia</i> .—G. |
| <i>Cochlearia glastifolia</i> . | <i>Oedera prolifera</i> .—G. |
| ———— <i>Draba</i> . | <i>Aristolochia sempervirens</i> . |
| <i>Sisymbrium pyrenaicum</i> . | ———— <i>Clematitis</i> . |
| ———— <i>millefolium</i> .—G. | <i>Carex paniculata</i> .—I. |
| <i>Cheiranthus alpinus</i> . | ———— <i>limosa</i> .—I. |
| <i>Arabis bellidifolia</i> . | ———— <i>capillaris</i> . |
| <i>Brassica Erucastrum</i> . | ———— <i>acuta</i> .—I. |
| ———— <i>chinensis</i> . | ———— <i>rigida</i> . |
| <i>Hermannia odorata</i> .—G. | ———— <i>stricta</i> . |
| ———— <i>micans</i> .—G. | ———— <i>riparia</i> .—I. |
| <i>Erodium crassifolium</i> .—G. | <i>Carpinus Ostrya</i> . |
| ———— <i>incarnatum</i> .—G. | ———— <i>virginiana</i> . |
| <i>Pelargonium tenuifolium</i> .—G.] | <i>Thuja occidentalis</i> . |
| ———— <i>gibbosum</i> .—G. | ———— <i>orientalis</i> . |
| ———— <i>ovale</i> .—G. | <i>Salix alba</i> . |
| ———— <i>tricuspidatum</i> .—G. | <i>Ophoglossum vulgatum</i> .—I. |
| <i>Geranium lividum</i> . | |

JUNE, 1802.

June	Ther.	Bar.	Wind.	
1	57 58 53	30.3	E. N. E. E.	{ A fine sunshine day; wind somewhat cold.
2	57 58 55	30.2 30	N. E. E.	
3	56 58 60	29.7 29.6	N. E. E. S. E.	
4	62 62 66	29.4	E. W.	{ Rain last night, showers of rain and some sunshine at times this morning; mild and very warm from three to four; thunder, but at a distance; rain from four till night.
5	62 63 61	29.4	W. E. S. E.	
				{ Rain early this morning, missing rain from six to nine; sunshine after till two; small showers till six, sunshine after, a fine night at ten.

<i>June</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
6	55 58½ 60	29.4	S. W. W.	Heavy rain this morning till ten; sunshine till about one, rain till two; dull with missing showers; heavy showers at seven; cleared up about eight in the evening.
7	58 58 59	29.5	W S. W. S. E.	A fine sunshine till eleven; cloudy and rain at two; clear and some sunshine till towards six; then rain; fine at night.
8	58 60 64	29.6	W. S. W.	Fine this morning, with sunshine at times; cloudy very often; a little rain at noon; smart rain till towards four; fine till night; rain at ten this night.
9	54 60 58	29.37 29.23	S. W. W. S. S. W.	Rain in the early part of the morning; missing rain at six, dull at eight, a little sunshine till noon; rain till three, cloudy but fine afterwards.
10	59 61 60	29.23 29.25	W. S. W. N. S. W.	Cloudy and very high wind this morning till eleven; rain at twelve; sunshine, cloudy, and showers at intervals; part of a rainbow at six; wind still, and moonlight at ten.
11	56 64 60	29.34 29.42	E. S. W. W.	Rain, high wind till eight; sunshine till noon; a very heavy shower of rain between one and two; showery at various times this day.
12	58½ 59 61	29.53	W.	Cloudy and dull this morning; sunshine from nine to ten; showers of rain between eleven and twelve, and between one and two; fine afterwards; moonlight at ten.

June	Ther.	Bar.	Wind.	
13	57 60 64	29.9	W. N.N.W.	{ Cloudy and sunshine at times this morning; rain between nine and ten; sunshine; a heavy shower at one; mizzling at three; fine after.
14	57½ 64 66	30.1	W. N. W.	{ Cloudy till eight, sunshine till twelve, cloudy after; a few drops of rain at three, and eight evening.
15	60 72 71	30.1	W. N. W.	{ A little mizzling rain till eight; a very fine sunshine day afterwards.
16	59 72 69	30.1	W. N. W.	{ Some light mizzling rain early this morning; cloudy and dull all day; the wind pretty high all the day.
17	58 64 62	30.1	N.E. E.	{ Cloudy and dull; a few drops of rain between nine and ten this morning; cloudy and mild all this day.
18	58 60 64	30.9	N. E. N. W.	{ Cloudy and dull the most part of this day.
19	60½ 69 68½	30.8	W. S. W. N.	{ A fine, cloudy, and sunshine morning at intervals; a little rain at eleven; fine after.
20	59½ 62 64	29.25	N.N.E. E. S. E.	{ Fine sunshine at times this day, but mostly cloudy.
21	65 67 69	30.8	N. W. E N.E.	{ A fine dew, and sunshine this morning; sunshine the most part of this day, and very calm at times.

<i>June</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
22	59 66 65	30.16	N. E. N.	Cloudy, and a little misling rain after six; fine sun till nine this morning; misling rain soon after nine to eleven; sunshine and cloudy at intervals; about a quarter before eight, misling rain and sunshine for a few minutes, and part of a rainbow, but soon gone.
23	60 62 63	29.88	W. N. W. N.	Cloudy, and pretty high wind this morning; a little misling rain from nine to ten; sunshine most part of the day afterwards; a fine night at ten.
24	57½ 64 66	30.5	N. W. N.	Cloudy and sunshine at intervals this day; wind pretty high all day; a light misling rain at nine this night.
25	61 69 69	30	N. W. W.	Cloudy and dull the most part of this day; misling rain at night.
26	64 68 61	29.8	W. S. S. W.	Misling rain this morning; cloudy and dull, with small rain most part of the forenoon; a cloudy but dry afternoon; much like for rain at ten this night.
27	58 64 62	29.5	W. S. W.	Misling rain till nine this morning; cloudy and some sunshine at times this day; wind pretty high; rain at six this evening.
28	59 63 56	29.3	W. N. W.	Some light showers of rain, and sunshine at times till noon; at half past twelve a heavy shower of hail, which lasted for some time; it grew very dark, and at one o'clock very vivid lightning, with tremendous thunder; one of the thunder claps, after one would have thought it spent, made an explosion like the shot of a cannon; heavy showers of hail and rain, more lightning and thunder at three; sunshine till six; then a heavy shower, and part of two rainbows, which lasted for some time; wind pretty high this day.

<i>June</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	{	Cloudy, wind pretty high, and air very sharp this morning; hea- vy showers of rain and hail from ten till three; some sunshine af- ter at intervals; half after seven two rainbows.
29	52				
	60	29.6	N.N.W.		
	58		W.		

30	59			{	Cloudy and sunshine this morning; wind high, and showers of rain at eleven, twelve, and two; sun- shine and cloudy at intervals.
	60	29.67	W.N.W.		
	64				

Quantity of rain falling	{	inches.
this month.		1.63

PLANTS

PLANTS,

THAT FLOWER IN

JUNE.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 54, VOL. II, PART II, 1801.

Veronica pinnata.
 — *laciniata.*
 — *incisa.*
 — *prostrata.*
Phalaris phleoides.
Milium lendigerum.
Agrostis miliacea.
Poa alpina.
Houstonia coccinea.—G.
Cornus suecica.
 — *alba.*
 — *stricta.*
Anchusa officinalis.
Lycopsis pulla.
 — *arvensis.*—I.
Lonicera dioica.
 — *grata.*
Euonymus latifolius.
 — *verrucosus.*
 — *americanus.*
Staavia glutinosa.—G.

Vitis hederacea.
 — *laciniosa.*
 — *arborea.*
Tamarix germanica.
Turnera ulmifolia.—S.
Telephium Imperati.
Linum usitatissimum.—I.
 — *perenne.*
 — *tenuifolium.*—I.
Crassula coccinea.—G.
Mahernia pinnata.—G.
 — *incisa.*—G.
Rumex Patientia.
Erica lutea.—G.
 — *paniculata.*—G.
 — *articularis.*—G.
 — *depressa.*—G.
 — *fascicularis.*—G.
 — *ramentacea.*—G.
 — *imbecilla.*—G.
 — *albens.*—G.

Daphne

Daphne Tarton-raira.
 — *Gnidium.*
Rheum compactum.
 — *hybridum.*
Kalmia angustifolia.
Rhododendron ponticum.
Cotyledon Umbilicus.—I.
 — *lutea.*
Sedum stellatum.
Spiraea thalictroides.
 — *Filipendula.*
Rubus arcticus.
Potentilla pensylvanica.
 — *argentea.*
Cistus incanus.
 — *salvifolius.*
 — *halimifolius.*
 — *elongatus.*
 — *lævipes.*
 — *libanotis.*—G.
 — *umbellatus.*
Corchorus olitorius.—S.
 — *capularis.*—S.
Atrage ne alpina.
Clematis Viorna.
Ajuga Chamæpitys.
Byssopogon canariense.—G.
Lamium amplexicaule.—I.
Ballota lanata.
Pidicularis palustris.—I.
 — *sylvatica.*—I.
Antirrhinum reticulatum.—G.
Anarrhinum bellidifolium.
Brunfelsia americana.—G.
Digitalis canariensis.—G.

Vella annua.
Biscutella auriculata.
 — *apula.*
Cardamine græca.
Brassica campestris.—I.
Crambe filiformis.
Cleome viscosa.—S.
Sida indica.—S.
Spartium patens.
Ononis antiquorum.
 — *mitissima.*
Pisum sativum.
 — *arvense.*
 — *Ochrus.*
Orobus sylvaticus.—I.
Lathyrus inconspicuus.
 — *fetifolius.*
 — *Clymenum.*
 — *angulatus.*
Pforalea bracteata.—G.
 — *corylifolia*—S.
Lotus ornithopodioides.
Trigonella platycarpus.
 — *monspeliaca.*
Tragopogon crocifolium.
Scorzonera hispanica.
 — *laciniata.*
 — *tingitana.*
 — *muricata.*
 — *Picroides.*—I.
Lactuca perennis.
Leontodon palustre.
Hieracium prenanthoides.
 — *molle.*
Crepis aspera.

Crepis filiformis.—G.
Cnicus cernuus.
Gnaphalium Stœchas.—G.
 ——— ignescens.—G.
 ——— patulum,—G.
 ——— plantagineum.
Erigeron philadelphicum.
Inula æstuans.
Chrysanthemum myconis.
Madia viscosa.
Sigesbeckia flosculosum.—S.
Centaurea crupina.

Centaurea aspera.
 ——— ægyptiaca.—G.
Calendula officinalis.
 ——— pluvialis.
 ——— hybrida.
Satyrion albidum.—I.
Passiflora lunata.—S.
 ——— angustifolia.—S.
 ——— cærulea.
Momordica Elaterium.
Valantia hispida.

JULY 1802.

<i>July</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
1	60 61 62	29.13	W. N. W.	{ Rain last night and this morning; cloudy and missing rain most part of the day; a quarter before eight two rainbows.
2	59 56 57	29.22 29.9	W. N. W. N.	{ Cloudy, cold, and some weak sun- shine this morning; heavy showers of rain this day; a quarter past six two rainbows; high wind; cloudy at ten this night.
3	52 54 55	29.48	W. N. W.	{ Cloudy, cold and high wind; some sunshine this morning; heavy rain from ten till noon; a small show- er at four, a little sun after; but mostly cloudy, high wind; sky clear at ten this night.
4	58 $\frac{1}{2}$ 61 60	29.84	W. N. N. W.	{ Cloudy and cold with a high wind, some sun-shine till noon; after noon missing rain at times and cold; wind high, and rain at ten this night.
5	51 59 $\frac{1}{2}$ 59	29.8	W. S. W.	{ Sunshine till seven; rain from eight till two; cloudy and dull after- wards.

<i>July</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
6	61 62 60	29.55	W. N.N.W.	{ A very high wind ; clouds and sunshine at times this morning ; showers of rain at times ; glimpses of the sun and rainbows often this day ; wind much abated at ten this night.
7	56 67½ 65½	29.97	N. W. S. E. E.	{ Fine this day, with sunshine and clouds at times ; very mild ; cloudy and appearance of rain this night at ten.
8	63 64 62	29.68	E. S. E. S. W. W.	{ Rain early this morning, and till eight ; cloudy and sunshine at times afterwards ; wind pretty high this day ; sky clear at nine this night.
9	56 62 61	29.69	W.	{ Rain early before six ; sunshine till ten ; cloudy and showers of rain at various times this day ; wind high all day.
10	63 66 62	29.4	E. W. S. W.	{ Very heavy rain early this morning, and till eight ; sunshine till eleven ; cloudy, close, and sultry, with showers of rain ; some thunder at two, but at a distance.
11	55 64 60	29.2	N. W.	{ High wind and sunshine till eleven ; cloudy and missing rain, heavy shower at twelve ; frequent showers this afternoon ; part of a rainbow at four.
12	57 61 60	30.2	N. W.	{ Much rain early this morning ; sunshine at eight ; cloudy till noon ; missing rain at four, and at six ; then a rainbow ; after sunshine ; cloudy at ten this night.

July	Ther.	Bar.	Wind.	
13	56 59 58	29.99	W. N. E. by N	{ Fine this morning with sunshine till ten; missing rain at noon; cloudy and some sunshine towards evening; missing rain at nine this night.
14	54 61 60	30	N. E.	{ A fine sunshine morning; clouds at intervals; wind pretty high this day.
15	53 51 50½	30	N. E. S. E. N.	{ Cloudy and dull; rain from seven till six evening; fine after six, with sunshine; sky clear at nine this night.
16	53 58 55	30 29.8	W.	{ Cloudy and misty with some rain this morning; missing rain at times most part of the day; wind pretty high and very cold all day.
17	59½ 61 58	29.66	N.N.W. N.	{ Fine this morning till eight; heavy showers of rain between nine and ten; frequent showers and sunshine this day, at intervals; wind very high this afternoon.
18	56 67 64	29.99	N.N.W.	{ Fine till ten; rain, then fine sunshine; a shower of rain between four and five; very fine sunshine after, and very pleasant; sky clear and calm at ten this night.
19	60 66 61	29.9	N. E. N. W.	{ Fine sunshine till three; a heavy shower of rain which continued for half an hour; at four part of a rainbow; missing rain at six, with two rainbows; missing rain after; cloudy, but fair at ten this night.
20	59 64 65	29.8	N. W. W.	{ Fine sunshine this morning; at ten some rain; missing showers, with warm sunshine at intervals.

<i>July</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
21	59 $\frac{1}{2}$ 59 53	29.5 29.4	N. E. N. W.	{ Cloudy and dark till about eleven; some rain from half past twelve, heavy constant rain till night, rain- ing at ten this night.
22	55 61 61	29.4	N. W. N.	{ Cloudy and misty with a little rain about seven; sunshine and cloudy at intervals; a shower at three, then cloudy and showery till night.
23	56 62 61	29.8	N. W. W. N.N.W.	{ Fine sunshine, with wind pretty high this morning; cloudy, and a shower of rain at noon; cloudy and sunshine at intervals after- wards; cloudy at nine this night, and cold.
24	57 63 62	30.1	W. N. W.	{ Sunshine this morning; cloudy and sunshine, warm and fine, this day; cloudy at ten this night, and cold.
25	55 65 63	29.8	N. W. E. S.	{ Light missing rain this morning; cloudy, and a little sun about noon, then rain till five; missing rain at six, dull after.
26	60 67 66	29.8	W. E. S.	{ Cloudy this morning; very little sun this day; missing rain most part of the afternoon.
27	63 61 59	29.6	E.N.E. W.	{ Misty fog this morning; missing rain at two; heavy rain from six till late at night.
28	60 67 66	29.62	W. N.W.	{ Cloudy this morning; sunshine and cloudy for the most part of the day; a little missing rain at eight evening.

JULY.

55

July	Ther.	Bar.	Wind.	
29	59 67 65	29.76	W. N.W.	{ Rain early this morning; cloudy, and sunshine at times this day; wind high, showers towards evening.
30	56 63 59	29.64	W. N.W. W.	{ Wind high, with some sunshine this morning; heavy showers of rain from eleven, at intervals, till night; part of a rainbow at six.
31	59 64 62	29.78	W. N.W.	{ Missing at six this morning; cloudy and a little sunshine, cloudy the most part of the day, wind high.

Quantity of rain falling } inches,
this month. 4.42

PLANTS

PLANTS,

THAT FLOWER IN

JULY.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 68, VOL. II, PART II, 1801.

<i>Olea fragrans</i> .—G.	<i>Scabiosa ficula</i> .
<i>Gratiola officinalis</i> .	—— papposa.
<i>Amethystea cærulea</i> .	<i>Plantago maxima</i> .
<i>Ziziphora capitata</i> .	—— cornuti.
—— tenuior.	—— amplexicaulis.
<i>Salvia grandiflora</i> .	<i>Echium italicum</i> .
—— clandestina.	—— creticum.
<i>Panicum Crus-corvi</i> .—S.	<i>Campanula thyrsoidea</i> .
<i>Alopecurus bulbosus</i> .	—— peregrina.
<i>Poa amboinensis</i> .	<i>Nicotiana Tabacum</i> .
—— palustris.	—— glutinosa.
<i>Uniola spicata</i> .	<i>Atropa physaloides</i> .
<i>Cynofurus coracanus</i> .—S.	<i>Physalis somnifera</i> .—G.
—— ægyptiacus. —G.	—— aristata. —G.
<i>Bromus distachyos</i> .	—— Alkekengi.
<i>Stipa pennata</i> .	—— pubescens. —G.
—— capillata.	<i>Diosma capitata</i> .—G.
<i>Arundo epigejos</i> .	—— tetragona. —G.
<i>Elymus virginicus</i> .	<i>Swertia perennis</i> .
—— philadelphicus.	<i>Phellandrum Mutellina</i> .
<i>Hordeum jubatum</i> .	<i>Seseli Hippomaranthum</i> .

Bafella

- Basella alba*.—S.
 ——— *rubra*.—S.
Statice monopetala.—G.
Juncus articulatus.—I.
 ——— *uliginosus*.—I.
 ——— *bufonis*.—I.
Rumex Hydrolapathum.
 ——— *acutus*.—I.
 ——— *obtusifolius*.—I.
 ——— *pulcher*.—I.
 ——— *Lunaria*.—G.
 ——— *vesicarius*.
Triglochin palustre.—I.
Epilobium palustre.—I.
Dodonæa triquetra.G.
Podalyria capensis.—G.
Cassia biflora.—S.
 ——— *ligustrina*.—S.
 ——— *marilandica*.
Trianthema monogynia.—G.
Cucubalus parviflorus.
Silene gallica.
 ——— *ceraftoides*.
Penthorum Sedoides.
Phytolacca decandria.
Potentilla bifurca.
Geum virginianum.
 ——— *rivale*.—I.
Papaver somniferum.—I.
Nepeta nuda.
Bystropogon punctatum.—G.
Galeopsis grandiflora.
Scutellaria altissima.
Prunella hyssopifolia.
Euphrasia officinalis.—I.
 ——— *Odontites*.—I.
- Antirrhinum genistifolium*.
 ——— *medium*.
Digitalis lutea.
 ——— *obscura*.—G.
 ——— *Sceptrum*.—G.
Myagrum orientale.
Lepidium subulatum.—G.
Cheiranthus fenestralis.—G.
Pelargonium columbinum.G.
Sida triloba.—S.
Hibiscus Rosa-Sinensis.—S.
 ——— *Abelmoschus*.—S.
Dolichos Soja.—S.
Hedysarum gangeticum.—S.
 ——— *canadense*.
 ——— *obscurum*.
 ——— *onobrychis*.
Astragalus pentaglotis.
Melaleuca thymifolia.—G.
 ——— *hypericifolia*.—G.
Hypericum Androsæmum.—I.
 ——— *montanum*.
 ——— *tomentosum*.—G.
Hieracium porrifolium.
 ——— *amplexicaule*.
 ——— *intybacea*.
 ——— *Kalmii*.
Carduus canus.
Cnicus oleraceus.
Carthamus lanatus.
Spilanthus Pseudo-Acmella.—S.
Bidens Cernua.—I.
Eupatorium Ageratoides.
Chrysocoma ciliata.—G.
Santolina Chamæ-Cyparissus.
 ——— *rosmarinifolia*.

Santolina

Santolina anthemoides.

Athanasia trifurcata-G.

———— *crithmifolia*.—G.

Gnaphalium luteo-album.

Xeranthemum retortum.—G.

Baccharis ivæfolia.—G.

Cotula coronopifolia.—G.

Eclepta erecta.—S.

Rudbeckia purpurea.

Coreopsis verticillata.

Ophrys cordata.—I.

———— *Læfelii*.

Serapias palustris.—I.

Typha latifolia.—I.

Xanthium fruticosum.—G.

Sicyos angulata. —G.

Mercurialis annua.—I.

Andropogon muticum.—S.

———— *fasciculatum*.—S.

Holcus bicolor.—S.

———— *Sorghum*.—S.

———— *Saccharatus*.—S.

Equisetum hyemale.—I.

Osmunda regalis.—I.

———— *Spicant*.—I.

AUGUST

AUGUST, 1802.

Aug.	Ther.	Bar.	Wind.	
1	57 64 60	30.1	W. S.	{ Cloud and dull this morning ; calm and mild ; heavy rain after four, to ten at night.
2	59 65 68	30.	W.S.W. N. W.	{ The rain from last night continued till about eight this morning ; cloudy and dull all this day ; mif-ling rain at nine and ten this night.
3	63 65 71	30.3	S.W. W.	{ Cloudy and misty this morning ; cloudy and a small shower of rain at noon ; fine sunshine after, and very warm ; a fine night at ten.
4	62 67 64	30.	E. N. E.	{ A very heavy dew (almost to appearance frost) this morning, and a very fine sunshine day ; wind high all day, cloudy about ten, and a little rain afterwards at night.
5	63 $\frac{1}{2}$ 75 74	29.83	E. S.W. W.	{ A little rain about six, this morning ; sunshine and cloudy at times, a very fine pleasant warm day, wind high, clear at ten this night.
6	63 69 69	29.8	W. S.W.	{ Cloudy and a little rain this morning ; cloudy and sunshine, with the wind high all day ; a little rain towards night.

<i>Aug.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
7	65½ 70 73½	29.7	W. S. W. S.	{ Cloudy this morning ; wind high and drying ; fine sunshine most part of this day ; a fine night at ten.
8	65		W.	{ Fine sunshine and high drying wind this morning ; sunshine, cloudy, and a little rain about noon ; frequent showers this afternoon.
½ p. 11	75	29.74	S. W.	
12	70		S.	
4	70			
9	65 72 64	29.77	W. S. W. E.	{ Missing rain, sunshine, and clouds frequent this morning ; cloudy and missing showers till six ; then a very heavy shower, which lasted for half an hour, then two beautiful rainbows.
10	64			{ Sunshine till eight ; cloudy and dull most of the day ; heavy rain at six ; missing at ten this night.
½ p. 10	68	29.77	E.	
12	64		S. E.	
4	61			
11	54 66 62	29.7	W. N. W. S. W.	{ Much small rain this morning ; cloudy and sunshine till noon ; heavy rain at one, showery all the afternoon ; heavy rain at ten this night.
12	55 67 62	29.9	W. S. W.	{ A fine sunshine morning ; cloudy and sunshine till four, then a shower of rain, cloudy after ; a fine night at ten.
13	65½ 65 63½	30.1	N. E. E. by S. E. E. by	{ Fine this morning ; sunshine most part of this day, cloudy at times.
14	63 71 70	30.18	E.	{ A little missing rain this morning ; cloudy, but a fine day, missing after six this evening.

Aug.	Ther.	Bar.	Wind.	
15	68 77 74	30.1	W.	Dull till seven; a fine sunshine day, and very warm; some few clouds at times.
16	68 $\frac{1}{2}$ 77 $\frac{1}{2}$ 74 $\frac{1}{2}$	30.4	S.W.	A little missing rain this morning till eight; fine sunshine after till near four, a light shower, and at six; cloudy after.
17	72 $\frac{1}{2}$ p. 10 77 12 75 4 68	29.95	W. S.W. S.S.E. E.	Fine dew, and sunshine till towards noon; cloudy, and sunshine at in- tervals, a fine day and very warm.
18	72 74 71	29.66	W. S.E. S.W.	Wind high, cloudy and sunshine at intervals; rain about four, and a rainbow, rain ten minutes before five and two rainbows; more rain between eight and nine, this even- ing.
19	61 63 65	29.64	W. N.N.W.	Missing rain to eight; cloudy and very dull all day.
20	58 63 $\frac{1}{2}$ 65	29.51	W. S.W. S.S.W.	Cloudy with showers, and heavy rain about eleven to twelve; dull, and rain towards evening.
21	59 68 $\frac{1}{2}$ 63	29.8	W. N.W. S.W. S.S.W.	Wind high, cloudy, and sunshine at intervals; dark and very cloudy at times this afternoon.
22	60 69 67 $\frac{1}{2}$	29.7	W.	Cloudy and rain between six and seven; sunshine and cloudy till six; about half past six, part of a rainbow, cloudy and dark at nine this night.
23	58 60 60	29.59	E. S. W.	Heavy showers till eleven, wind high, and fair; sunshine towards even- ing; a fine clear night at ten.

<i>August.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
24	57 54 58½	29.45	W. E.	{ Constant rain till one; fine sunshine till four; at five rain, and part of two rainbows, missing the rest of the evening, wind high.
25	54 57 60	29.72	N.W. W.	{ Fine with sunshine this morning; heavy showers from ten to one; fine after with sunshine; cloudy and rain at ten this night.
26	56½ 63½ 62	29.97	N.W. W.	{ Dull and cloudy this morning; sunshine about ten; cloudy at noon, sunshine after; clear at ten this night.
27	59 64 67½	29.97	N.W. W.	{ Rain till one o'clock; sunshine about two; fine, but cloudy afterwards.
28	60 73 76	30	W.	{ The eclipse of the sun very visible this morning; fine sunshine all this day.
29	59 75 71	30.4	W. E. N.W.	{ A very fine sunshine morning; cloudy towards evening.
30	62 68½ 67	30.1	W. E. S.E.	{ Sunshine before six this morning; cloudy and dull all day, but fine.
31	59 64 61	30.1	W. E.	{ A fine dew this morning; sunshine the most part of this day; wind high.

Quantity of rain falling } inches.
this month. } 2.76

PLANTS.

PLANTS,
THAT FLOWER IN
AUGUST.

CONTINUED FROM THE TRANSACTIONS OF THE DUBLIN SOCIETY,
PAGE 81, VOL. II, PART II, 1801.

<i>Jasminum glaucum</i> .—G.	<i>Achyranthus lappacea</i> .—S.
<i>Cunila pulegioides</i> .	————— <i>patula</i> .—S.
<i>Aira cæspitosa</i> .—I.	<i>Crithmum maritimum</i> .—I.
———— <i>flexuosa</i> .—I.	<i>Zygophyllum Fabago</i> .
<i>Cornus sericea</i> .	<i>Arenaria laricifolia</i> .
<i>Goodenia calendulacea</i> .—G.	<i>Hyssopus Nepetoides</i> .
<i>Coffea arabica</i> .—S.	<i>Ruellia clandestina</i> .—S.
<i>Lonicera Symphoricarpos</i> .	<i>Sisymbrium Loeselii</i> .
<i>Phytica eriophoros</i> .—G.	<i>Gnaphalium glomeratum</i> .
<i>Diosma latifolia</i> .—G.	<i>Erigeron canadense</i> .

SEPTEMBER.

SEPTEMBER, 1802.

Sept.	Ther.	Bar.	Wind.	
1	59 67 64	29.95	W. E.	{ A thick fog this morning, and rain between nine and ten; sunshine, and cloudy; rain at two, and at various times this afternoon.
2	62 60 64	29.6	S. E.	{ Rain last night, high wind and just a glimpse of the sun about nine, showers till one, cloudy after; heavy rain from six till eight, fine after; vivid lightning this night.
3	62 69 60	29.32	W. S. W. S. S. E. N. E. E.	{ Sunshine and high wind till two; constant rain from that hour till night; high wind and rain at ten this night.
4	62 67 64	29.27	E. N. E. N. N. W.	{ Very high wind; but fine with sunshine; a shower of rain a quarter before twelve; cloudy and sunshine, another shower at four, sunshine afterwards; cloudy at ten this night.
5	57 58 55	29.6	N. N. E. E.	{ Cloudy and rain from seven to nine; cloudy and rain from twelve to one; fair but cloudy after.

Sept.	Ther.	Bar.	Wind.	
6	55 57 58	29.9	E. N.N.E.	{ Cloudy and dull with missing rain this forenoon; a fine afternoon with some sunshine; a fine clear night at ten.
7	50 59 55	30	E. N. E.	{ A fine dew this morning; sunshine and cloudy at intervals; a very fine day.
8	52 58½ 59½	29.9	N.N.E. E.S.E. S. S. E.	{ A heavy dew (very near being a frost) this morning; fine sunshine, some times cloudy; a fine day.
9	57 58 56	29.5	W. S. W.	{ Cloudy and dull, from six to eight missing rain; some sunshine about eleven; sharp rain from twelve till four, part of a rainbow at four, another at five, fair but cloudy after; the wind high this day.
10	53 58 55	29.2.	W. N. W.	{ High wind, fine sunshine this morning; wind very strong, almost a storm; and heavy showers at various times this day; part of a rainbow at four, another ten minutes after six, with a shower of hail.
11	48 54 51	29.7	N. W. W.	{ Wind high; sunshine and a light frost this morning; a shower of rain and hail about ten; cloudy and sharp showers at intervals this day; a fine clear moonlight night; at ten, two thirds of the south limb of the moon eclipsed.
12	45 54 55	29.7	W. N. W.	{ Sunshine morning (almost a frost), some missing rain about eleven and twelve; sunshine afterwards, a fine day, wind high all day; moonlight and a circle round the moon at eight o'clock.

Sept. Ther. Bar. Wind.

13 45 N. E.
58½ 29.89 W.
56

Heavy rain early this morning and till nine ; cloudy but fair till four, missing rain again between five and six, a little sun after ; cloudy but fine at ten this night, wind high all this day.

14 58½
66 29.89 W.
64

Cloudy with a light missing rain about ten ; a little sun till towards two ; cloudy and dull, a few drops of rain at times ; wind high all this day.

15 62
70 30 W.
66

Fine sunshine mostly till four, cloudy and missing rain at five, fine afterwards ; this has been a very fine day, and mild.

16 64
65 30.1 W.
63½

A fine sunshine and cloudy morning ; sunshine the most part of the day ; very fine and mild.

17 64
69 30 W.
66 S. S. W.

A fine dew, cloudy, and showers passing about ; a rainbow twenty minutes past eight, this morning sunshine and cloudy, a fine day, and mild ; cloudy and fine at ten this night.

18 58
69 29.9 S. E.
66 S. W.
W.

Fine sunshine and a heavy dew this morning ; very warm sunshine till three, then cloudy ; wind high and rain at ten this night.

19 56
59 30 W.
57 E.

Cloudy all this morning ; some rain towards noon ; heavy rain from twelve till four ; missing about five, sunshine about six, part of a rainbow, cloudy afterwards ; cloudy and dark at ten this night.

Sept.	Ther.	Bar.	Wind.	
20	52 62 58	29.98	S. E. E.	{ A fine dew and fog this morning ; cloudy and sunshine at intervals this day ; cloudy and rain at eight this night.
21	60 68 66	29.7	W. S.S.W.	{ A fine dew, cloudy, and sunshine, at various times, this day ; a very fine mild day.
22	61 70 62	30	E. S. E.	{ A very fine day, cloudy, and sunshine at intervals ; wind high, but very mild ; fine, clear, starlight night at ten.
23	53 62 58	30	E. S.S.E.	{ Thick fog and fine dew this morning ; sunshine the most part of this day, wind high ; clear and starlight at ten this night.
24	55 63 59	30.8	E.	{ A fine dew and heavy fog this morning ; sunshine most part of the day ; mild and calm ; a fine clear sky at ten with a thick fog on the river.
25	55 61 59	30.2	E. S.E.	{ A fine dew and heavy fog this morning ; very fine sunshine all this day ; starlight night, dew and fog falling fast.
26	56 67 65	30.3	N.N.E. E. W.	{ A fine dew and very foggy this morning ; sunshine, and a fine sunshine day, warm and mild ; night clear, and stars to be seen at ten.
27	60 59 59½	30.3	W. S.E.	{ Cloudy but fair till eight ; missing rain till noon, rain about four, fine afterwards, no sunshine this day : night fine but dark.
28	57 61 56	30.3	S.E. E.	{ A fine dew this morning ; sunshine all day ; night clear and starlight at ten.

SEPTEMBER.

69

<i>Sept.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
29	54	30.3	E. S.E.	{ A heavy dew and sunshine this morning ; a very fine sunshine day ; a fine night at ten.
	60			
	61			
30	53	30.2	S. E. S. W. W.	{ A fine dew and sunshine till noon ; cloudy but fine, wind high ; a clear sky at ten this night ; this might be, almost, called our summer.
	64			
	62			

Quantity of rain falling } Inches
this month. } 1,4.

OCTOBER.

OCTOBER, 1802.

<i>October</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
1	59 67 65	30.13	W.	{ Cloudy and dull, sun just appearing about eight ; a little misling rain at noon ; part of a rainbow at half past three ; wind high but mild ; cloudy at ten this night.
2	62 66 67	30.2	W.	{ Cloudy, sunshine, and misling rain this forenoon ; sunshine in the afternoon, wind very high ; clear starlight at ten this night.
3	58 $\frac{1}{2}$ 68 55	29.7	S.W.	{ A fine sunshine morning ; cloudy towards noon, much appearance of rain this evening ; wind very high all day ; vivid lightning about close of day, rain this night between eight and nine, and at ten this night.
4	54 60 54	29.97	S.W. W.	{ Cloudy and some sunshine at times this morning ; a heavy shower of hail and rain between ten and eleven, and rain about twelve ; sunshine and cloudy at intervals this afternoon ; wind very high all day, stars and moonlight till about eight, cloudy and dark after.

<i>October</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
5	45 55 54	29.97	W. N.W.	{ Sunshine and cloudy this morning, and till noon; sunshine the most of the afternoon; wind high all this day; stars and moon bright this night at ten.
6	53 59 54	29.74	W. S.S.W.	{ High wind, cloudy and sunshine till about three; rain till four, cloudy but fair afterwards, dark and cloudy at ten this night.
7	57 60 56	29.74	W.	{ Missing rain and calm this morning; sunshine and the wind high towards noon; cloudy and missing rain, heavy rain about evening; dark and rain at nine this night, wind very high.
8	55 59 53	29.8	W.	{ Cloudy and some rain between six and seven, cloudy and some sunshine till towards noon; heavy rain this afternoon; fine and moonlight the early part of this night, cloudy and missing rain at ten.
9	48 52 49	29.85	W. N.W.	{ Misty clouds with sunshine till towards ten, heavy shower of rain at eleven, cloudy, sunshine, and showers this day at intervals, night fine and clear, stars and moon bright at ten.
10	42 51 49	29.91	W. N.W.	{ A heavy dew (very near being a frost) this morning; a beautiful sunshine day, night fine and clear; stars and moonlight; at eight a halo round the moon, but very distant.
11	46 48 50	29.81 29.6	E. S.E.	{ Cloudy and very dull, at half past eight this morning; heavy and constant rain all day, and the wind very high.

October Ther. Bar. Wind.

12 47
54 29.6 N.E.
52 N.W.

{ The rain had abated late last night, or early this morning; (*I found at eight o'clock, that the quantity of rain that had fallen, was about two inches on the square foot,*) cloudy but fine, some sunshine about ten; some light showers of rain at times, part of a rainbow at four, a very high flood in the river this day, night fine, clear, stars and moon bright at ten.

13 42
54 30 S.W.
52 W.N.W.
N.E.

{ A heavy dew, almost a frost, thick fog at seven; fine sunshine afterwards till noon; cloudy and sunshine in the afternoon; a fine night at ten.

14 52
58 30.3 W.
52 N.E.
E.N.E.

{ A fine dew this morning; clouds appearing very high, sunshine; a very fine day; fine moon and star light; a fog low upon the ground this night.

15 46
57 30.19 S.E.
51 E.
N.W.

{ A fine dew, almost a frost, with sunshine, a thick fog at ten; sunshine and fine all day, night fine, but a little mist at ten.

16 44
54 30.12 E.
51 N.W.

{ A light frost this morning; a beautiful sunshine day; misty towards evening, a thick fog at ten this night.

17 40
51 29.74 S.S.W.
54 S.E.

{ A white frost this morning; a little misty fog early, fine sunshine till towards noon; cloudy and dull, a little rain about three; cloudy and dark at nine this night.

<i>October</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
18	48 51 48	29.49	W.	{ Cloudy and a light rain between six and seven ; some sunshine about ten, cloudy with rain at times ; twenty minutes before four, part of a rainbow ; rain very sharp from five to seven ; night clear at nine.
19	51 53 49	29.4 29.1	S.E. S.W.	{ Cloudy and rain till about nine ; sunshine and showers frequent this day ; clear and wind high at ten this night.
20	44 51 48	29.45	W. S.S.W.	{ High wind, sunshine and cold this morning ; cloudy about noon, with showers of rain ; cloudy, showers, and sunshine at intervals this day ; a fine rainbow and very bright a little past two ; cloudy and dark at ten this night.
21	52 59 54	29.42 29.52	W. S.S.W.	{ A very great storm last night and this morning, with heavy showers of rain frequent this forenoon ; cloudy, sunshine, and showers at intervals this afternoon ; wind much abated, cloudy and dark at ten this night.
22	47 54 51	29.49 29.59	W.	{ Cloudy, and frequent showers of rain till noon ; sunshine, cloudy, and showers this afternoon ; a great deal of lightning the forepart of this night, the wind being very high all day.
23	44½ 53 50	29.67 29.72	W. N.W.	{ Sunshine and the wind high ; a circle round the sun at eleven ; cloudy and misty towards evening ; rain and calm at nine this night.

<i>October</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
24	42 53 49	29.3	N.N.W. S. E.	{ A light frost this morning ; misty about ten, wind very high, rain till noon ; fine till two ; about ten minutes before four, one of the heaviest showers that ever I saw, which lasted about ten minutes ; one tenth of an inch fell upon the square foot with that shower ; fine after : rain in the evening.
25	42½ 54 51	29.15	W. S.W. S.E.	{ Sunshine this morning at ten, rain and a rainbow at eleven, another rainbow at noon ; cloudy and sunshine till night, rain till eight, star-light at nine this night, wind high all day.
26	46 52 50	29.15	S.W. S.S.W. S.	{ Morning fine, sunshine till noon, cloudy and sunshine ; a fine dry day ; clear, and stars very bright at ten this night.
27	46 50 48	29.5	S.S.W. W.	{ Cloudy and dull all this day ; wind high all day ; a fine drying day ; night dry at ten.
28	46 51 50	29.4	S.E.	{ Cloudy and missing rain about seven, cloudy, and sunshine till noon, dull, and showers of rain in the afternoon ; high wind all day ; quite a storm from seven till twelve at night.
29	46 50 48	29.28	S.S.E.	{ Morning fine, but cloudy and calm ; a little sun at ten, dull till three ; sunshine until his going down, a fine calm star-light night at ten.
30	46½ 52 48	29.28	S.E. E.	{ Rain early this morning ; fine with sunshine, towards nine a shower ; sunshine and cloudy at intervals ; a fine drying day ; wind high and cold ; night clear at ten.

<i>October</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
31	35		E.	} A sharp frost this morning; fine sunshine all day, night dull, and missing rain from eight to eleven.
	50	29.3	N.E.	
	49			

Quantity of rain falling	}	inches.
this month.		3.24-

NOVEMBER.

NOVEMBER, 1802.

<i>Nov.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
1	50 49 47	29.6	N.E. N.	Misling rain till seven, a glimpse of the sun at half past seven, cloudy till ten, sun from ten till two; misling rain and a rainbow; part of another rainbow at ten minutes past four, dark and rain at night.
2	44 45 42	29.55	N.E. W.	Cloudy, sunshine, and small showers till nine; rain after till four, cloudy and dull after: moon and starlight at ten this night.
3	42 41 $\frac{1}{2}$ 43	29.6	N.W.	Cloudy this morning; rain from ten till one, sun and cloudy till night; dark at ten this night.
4	44 45 47	29.76	E. N.N.E.	Rain at times this morning; sun from nine till twelve, cloudy and dull after till night; wind growing very strong, and spitting rain at ten this night.
5	46 50 49	29.76	E.	Much rain last night or early this morning, continued till past seven, fine and some sun till ten, showers till twelve, cloudy till two, then sunshine and clouds till the going down of the sun; wind high, cloudy at ten this night.

<i>Nov.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
6	48 50 49	29.97	E.	{ Cloudy and dull all this day ; no sunshine, no rain, no moon, no stars ; this is one of the dark days.
7	46 45 43	30	N.N.E.	{ Some rain before day-light ; cloudy, and dull, the sun could be seen fre- quently through the clouds, but no sunshine ; wind high, night fine till nine, misty fog at ten.
8	41 47 43	30.6	N.N.E.	{ Morning cloudy, some sunshine and missing rain, before nine, and a rain- bow ; small showers of rain, sun- shine, and cloudy at intervals this forenoon ; afternoon cloudy and sun at times ; night fine ; moon- light till eight, cloudy at ten.
9	40 46 43	30.19	N.E. N.W.	{ Cloudy, and sunshine this morning ; sunshine till one, cloudy till three ; sun till night ; night fine, clear moonlight, and many stars, freez- ing very fast with a kind of green shade round the moon ; the Ther- mometer this night, from ten to one morning, twenty-nine ; at se- ven morning twenty-seven.
10 night 29				
10				
1 morn.	29			
7	27			
8	29	30	S. E.	{ Frost very sharp, and a heavy rime and thick fog ; the air was much softened by nine o'clock ; cloudy and dull all day ; night cloudy, neither moon nor stars to be seen, wind high.
12	46			
4	46			
11	44 47 43	29.6	E. S.S.E.	{ Some light rain early before day ; morning cloudy and dull till noon ; sunshine till one, dull afterwards ; wind high but fair, night fine with moonlight, stars, and fast flying clouds till nine, very cloudy after.

Nov. Ther. Bar. Wind.

12 41
42½ 29.8 N.E.
40

Rain last night and this morning before day ; cloudy and showers till eight, cloudy and dull at eleven, a shower of hail, then rain till noon ; fine and some sunshine till two ; missing rain at three, sunshine till his going down ; night fine, moon and star-light till half past eight, cloudy and rain at nine, fleet at ten.

13 40
45 29.9 E.
42 S.E.

Morning fine, sunshine ; sunshine the most part of the day ; wind high, fine star and moon-light this night.

14 40
45 29.8 S. E.
45 E.

Cloudy but dry this morning ; a little missing rain this forenoon ; appearing very much for rain, this afternoon ; wind high ; dark at night.

15 43
47 29.6 E.
46 S.E.

Heavy rain before day, and till nine ; cloudy and dull all day ; little wind this day ; night close, dark, and foggy.

16 43
46 29.8 E.
45 S.E.

A fine but dull morning ; missing rain from eight till nine ; cloudy till noon, foggy afterwards ; night dark and cloudy.

17 41
46 29.59 S.E.
44 E.

Cloudy, dull, and foggy this day ; night very dark.

18 44
47 29.5 S.E.
46

The sky very red this morning ; rain at seven, with high wind, constant rain all day and till past seven at night ; cloudy and dry at ten this night.

<i>Nov.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
19	38 47 48	29.5	S.W.	{ A light frost this morning ; cloudy, dull, and foggy till two ; some sunshine, with light showers of rain ; part of a rainbow at three ; heavy rain till night ; a fine clear sky, and stars to be seen at ten this night.
20	47 48½ 47	29.3	S.S.E.	{ Rain last night, or this morning before day ; cloudy with sunshine till ten ; dull till between one and two ; heavy rain till towards eleven or twelve at night ; wind very high.
21	48 51 50	29	E. S.E.	{ Cloudy and dull this forenoon, rain about noon ; showers at times till night, part of a rainbow ten minutes past three ; heavy rain till seven ; star-light at eight and nine ; heavy rain about twelve at night.
22	45 53 48	28.9	S. S.W.	{ Heavy rain this morning before day ; fine sunshine this forenoon ; cloudy afterwards ; a fine day ; the forepart of the night dark, some stars between eight and nine ; rain at ten this night.
23	47 48½ 47	29	N.E.	{ Rain the early part of this morning before day ; cloudy and dull about half past ten, rain which continued, I suppose, till some time early next morning.
24	44 42 46	29.34	W.	{ Cloudy and dry this morning at seven, continued cloudy till noon ; sunshine the most part of the afternoon, with clouds to the south east and east, part of a rainbow at three ; fine star-light at ten this night.

NOVEMBER.

81

<i>Nov.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
25	37 45 41	29.5	N.N.W.	{ A light frost with fine sunshine this morning; a fine sunshine day, the air very sharp; star-light to nine; cloudy and dark at ten this night.
26	41 45 43	29.5	N. N.N.E.	{ Light showers, cloudy, and some sunshine, this morning; rain between twelve and one; half past two a shower of hail, and two rainbows: duration about ten minutes; a light shower between eight and nine, star-light at ten this night.
27	41 44 42	29.5	N.W. N.N.E.	{ Rain early this morning and continued till nine; cloudy and sunshine till noon; mostly sunshine till night; a thick fog at ten this night.
28	39 42 41	29.59	N.E. N.W. N.N.E.	{ Misty clouds and missing rain till noon; afternoon dull and cloudy; a thick fog at ten this night.
29	42 46 43	29.88	E. N.E.	{ Light rain, cloudy, and sunshine till ten; cloudy, sunshine, and showers; at one, part of two rainbows, which soon was gone; another part soon appeared, which likewise was soon gone; a heavy shower at ten this night.
30	40 42½ 49	29.88	N.E.	{ A little rain about seven, soon over; sunshine most part of the forenoon, frequent light showers of rain; part of a rainbow a quarter before three; clearing up about night, moon and star-light about seven; freezing at eight and nine, changed about ten to missing rain and a thick fog.

Quantity of rain falling
this month.

{ Inches,
3.7

6

DECEMBER.

DECEMBER, 1802.

Dec.	Ther.	Bar.	Wind.	
1	35 42 41	29.75	N.E. S.W.	{ Very foggy this morning, till noon ; fine sunshine afterwards ; night fine at ten.
2	42½ 45 46	29.26	S.E. W.S.W.	{ Heavy rain early this morning, and continued all day and night ; with the wind very high, quite a storm.
3	42 42 40	29.3	N.E. W.	{ About seven this morning the rain abated, after the constant continu- ation of about thirty hours ; the rivers were very much swelled, so as to overflow their banks, and do much mischief in the country ; three inches of rain fell upon the square foot.
4	38 42 41	29.5	N.E. W. W.N.W.	{ Cloudy this morning, and dull all day, with frequent misting show- ers ; night fine, moonlight at ten, and a shade round the moon.
5	33 37 37	29.8	N.W.	{ A white frost this morning ; cloudy and sunshine ; a fine day ; night freezing with a shade round the moon.
8 n.	32			

<i>Dec.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
6	39 $\frac{1}{2}$ 43 43	29.9	W.	The frost all gone before day ; after daylight a slight frost, sunshine till noon : afternoon showery, and sunshine ; two rainbows a quarter before three ; night moonlight but few stars.
7	39 45 44	29.67	N.N.W. W. S.W. W.S.W.	A fine clear sunshine morning ; a very thick fog from about nine to ten ; fine sunshine till four, foggy till eight ; very fine moonlight, and a shade round the moon.
8	38 43 $\frac{1}{2}$ 43	29.74	S. E.N.E. N.E.	Mild and cloudy this morning ; missing foggy rain at times this day ; night cloudy with rain.
9	32 38 37	29.74	N. N.W.	A light frost this morning ; sunshine till noon ; cloudy the most of the afternoon ; night cloudy, and the wind very high from seven, which continued all night.
10	46 45 38	29.24	N. N.W.	Wind very high and rain, which continued till nine ; sunshine and cloudy, with some light showers ; got very cold towards night ; night cloudy, moonshine and showers.
11	37 41 40	29.9	W. N.W.	A fine sharp air ; cloudy and sunshine this morning ; cloudy most part of the day, wind high ; night moonlight, but often clouded.
12	40 46 48	29.9	N.N.W. W. S.W.	Missing rain this morning ; foggy clouds, and some sunshine, between one and two ; cloudy after ; night fine, moonlight at eight.
13	43 42 41	29.9	W. S.W.	Fine sunshine morning ; continued sunshine the most part of the day ; night fine, starry ; and moonlight at eight.

Dec.	Ther.	Bar.	Wind.	
14	39 42 42	29.8	W. S.W.	{ Cloudy with a few drops of rain this morning ; cloudy and some sunshine till two ; rain till three, evening fine ; night starry and moonlight at ten.
15	40 47 48	29.56	W.	{ Rain this morning, which continued till noon ; rain from two till three ; evening fine.
16	41 $\frac{1}{2}$ 43 42	29.8	W. N.E.	{ Rain before day (morning), wind very high, with heavy showers of rain till noon ; afternoon showers, cloudy, and sunshine, evening fine, night dark.
17	36 40 36 $\frac{1}{2}$ 9 n. 32	30.4	N. N.E.	{ Wind very high before day, morning more calm, and the ground much dried by the strong wind last night ; sunshine the most part of this day ; night clear, star-light, and freezing.
18	28 42 42	30.34	N.E. W.	{ A sharp frost this morning ; at ten it began to thaw ; cloudy and sunshine at times, evening dull, dark, cloudy ; and missing rain after seven at night.
19	46 $\frac{1}{2}$ 48 48	30.23	W. S.W.	{ Misty clouds, and missing rain most part of this day ; night cloudy and very dark.
20	46 46 47	30.23	S.W. S.S.W. W.	{ A fine mild morning about half past ten ; a very close dark fog, so that one could not see any object before them at six perches distant, which lasted till eleven ; sunshine, a light rain at noon ; sunshine, cloudy, and missing rain at times.

<i>Dec.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
21	32			A light frost and sunshine this morning ; sunshine, but dull, a circle round the sun at noon ; cloudy, evening fine, night freezing.
	38	30.23	N.W.	
9 n.	39			
	32			
22	29			A very sharp frost, and sunshine till one ; foggy till night ; night clear and freezing.
	33	30.23	N.W.	
	29		N.	
11 n.	24 $\frac{1}{2}$			
23	25			A very sharp white frost, which gave the ground and trees the appearance as if there had been a shower of snow ; sunshine, and foggy at times this day, night freezing.
	30	30.23	N.W.	
	32		NN W.	
11 n.	30			
24	33			Frost, with some fog this morning ; thawing towards noon ; sunshine just before he went down, and the sky very red ; night fine, clear, and plenty of glittering stars.
	38	30	S.E.	
	37		S.	
25	24			A very sharp frost this morning ; cloudy, cold, and misty ; foggy clouds from ten till night ; fleet at nine and ten at night.
	30	29.9	S.E.	
	32		N.E.	
			N.W.	
26	39			Rain early this morning ; wind very high and driving rain till four, fine after ; night clear at eight, and some stars to be seen.
	41	29.2	W.S.W.	
	40			
27	34			A little frost this morning ; sunshine and cloudy ; but dry this day, wind cold, and night dark.
	38	29.2	W.	
	37			
28	30			Freezing this morning ; sunshine, a few flying clouds about noon ; clear afterwards ; night clear, and plenty of stars to be seen at ten ; cloudy and upon a change.
	35	29.2	N.W.	
	32		W.	
8 n.	26			
11 n.	31			

DECEMBER.

87

<i>Dec.</i>	<i>Ther.</i>	<i>Bar.</i>	<i>Wind.</i>	
29	45 48 46	28.9	S.W. S.	{ Wind very high this morning, with driving rain, which continued till evening ; night dark, rain at times.
30	36 $\frac{1}{2}$ 44 44	29	S.W. S. E.	{ A light frost this morning ; sunshine till about ten ; cloudy and misting about noon ; sunshine and a rainbow soon after ; part of a rainbow a quarter before two ; sun and cloudy after, wind high, moonlight, and showers after eight this night.
31	42 45 45	29	S.W. W.S.W.	{ A heavy storm of wind and rain early this morning ; light showers this forenoon, sunshine and cloudy the afternoon ; showers and moonlight at times, this night a flood in the river.

Quantity of rain falling } inches.
this month. } 5.25

TREES

TREES AND SHRUBS,

THAT BUD

IN DECEMBER.

Pinus sylvestris, <i>v. tatarica</i> .	Philadelphus nana.
————— <i>v. montana</i> .	Cratægus torminalis.
————— <i>v. divaricata</i> .	Mespilus canadensis.
————— halepensis.	Rosa arvensis.
————— Pinea.	Clematis Viticella.
Acer Pseudo Platanus, <i>fol. aur.</i>	Lavandula Spica, <i>latifolia</i> .
Azalea nudiflora, <i>v. phænicea</i> .	Spartium multiflorum.
Staphylea pinnata.	————— Scorparium.
Vaccinium Myrtillus.	————— patens.
————— pallidum.	Coronilla valentina.
Daphne Mezereum, <i>autum.</i>	————— glauca.
Sedum populifolium.	

THE
QUANTITY OF RAIN,

FALLING THIS YEAR.



					<i>Inches. decim.</i>
January,	-	-	-	-	682
February,	-	-	-	-	1 145
March,	-	-	-	-	1 136
April,	-	-	-	-	86
May,	-	-	-	-	75
June,	-	-	-	-	1 63
July,	-	-	-	-	4 42
August,	-	-	-	-	2 76
September,	-	-	-	-	1 4
October,	-	-	-	-	3 24
November,	-	-	-	-	3 7
December,	-	-	-	-	5 25

Total, 26 993
or very near 27 Inches.

A
CATALOGUE
OF
TREES, SHRUBS, AND
HERBACEOUS PLANTS;

WHOSE LEAVES AND YOUNG SHOOTS WERE DESTROYED,
OR INJURED BY THE SEVERE FROST, ON THE 14TH.
15TH. AND 16TH. DAYS OF MAY, 1802.



Ulmus campestris,		
_____	<i>v. fol. aur. var.</i>	} Part of their tops nipped, others destroyed.
_____	<i>v. fol. arg. var.</i>	
_____	<i>v. latifol.</i>	
_____	<i>v. glab.</i>	} Tops partly nipped.
_____	<i>v. fol. aur. var.</i>	
_____	<i>v. fungosa.</i>	
_____	<i>v. stricta.</i>	} Tops slightly injured.
_____	<i>v. asplenif.</i>	
_____	<i>americana, v. rub.</i>	} Tops partly nipped.
_____	<i>v. alb.</i>	
_____	<i>v. pendul.</i>	

Ulmus

Ulmus pumila.—Young wood nearly destroyed, and leaves materially injured.

<i>Esculus Hippo-Castanum</i> ,	} Tops nipped, leaves remarkably injured, and dried up; budding on the former years wood; much disfigured.
_____ <i>v. fol. aur. mac.</i>	
_____ <i>v. fol. arg. var.</i>	

_____ <i>flava</i> ,	} Flower spikes destroyed—budding on the former years wood.
_____ <i>Pavia</i> ,	

Prunus Padus.—Tops of the young wood nipped.

_____ *v. minor*.—Slightly injured, but more so by insects.

_____ *rubra*.—From three to four inches of the tops of the young wood killed, likewise injuring by insects.

_____ *Cerasus*.—Their tender tops severely injured, and their flowers spoiled.

_____ <i>v. ramis. pend.</i>	} Tops slightly injured.
_____ <i>v. fol. pend.</i>	
_____ <i>v. fl. pleno.</i>	

_____ *nigra*.—The entire wood of this year's making destroyed; budding on the old thereof.

_____ *pumila*.—Part of this year's wood destroyed.

_____ *avium*.—Young wood nearly destroyed to the butt, no successive buds appearing.

_____ *Infititia*.—Somewhat injured.

_____ *Armeniaca*.—Greatest part of the young wood destroyed, and leaves much disfigured.

_____ *v. fol. aur. var.*.—As the former, with the better part of the last year's wood.

Prunus

- Prunus spinosa*.—Tops of their shoots somewhat injured.
 ——— *domestica*.—Slightly injured in their tops.
 ——— ——— *v. fol. arg. var.*.—Young wood and leaves destroyed, or nearly so.
 ——— ——— *v. fol. aur. mac.*.—Their tender tops slightly injured.
 ——— *virginiana*.—The last year's wood nearly destroyed.
 ——— *fibirica*.—Slightly bitten.
 ——— *Mahaleb.*.—A great part of the last year's wood destroyed.
 ——— *penfylvanica*.—A great part of this and the former year's wood destroyed; leaves much disfigured.
 ——— *caroliniana*.—Slightly injured.
 ——— *Lauro-Cerasus*, } Young wood destroyed; bud-
 ——— ——— *v. fol. var.* } ding on the last year's.
Pyrus communis, } Tops nipped, and part of their
 ——— ——— *v. fl. pleno.* } leaves disfigured.
 ——— *Malus* }
 v. fol. var. } Tops nipped, and fruit blasted.
 ——— ——— *prunifolia*.—Tops nipped, fruit blasted, and leaves much disfigured.
 ——— *Cydonia*.—Tops nipped, and much disfigured in their leaves.
 ——— *præcox*.—Young wood and leaves much injured.
 ——— *Pollveria*.—Injured in their tops.
 ——— *falicifolia*.—Slightly injured in their tops.
 ——— *angustifolia*.—Leaves much disfigured.
 ——— *coronaria*. }
 ——— *spectabilis*. } Slightly disfigured.
Sorbus hybrida. } Materially injured in their young wood
 ——— *domestica*. } and leaves, if not destroyed.
 ——— *aucuparia*. }
 ——— *canadensis*. } Slightly bitten.

Cratægus Aria. } Tops of the young wood injured.
 ———— *v. fol. var.* }

——— intermedia.—Young wood destroyed.

——— cordata.—Young wood and leaves much injured.

——— elliptica.—Tops of the young wood injured, and leaves disfigured.

——— pyrifolia. } Tops slightly injured.
 ——— glandulosa. }

——— coccinea.—Tops of the young wood injured, and leaves disfigured.

——— punctata. } Leaves disfigured.
 ——— *v. aurea.* }

——— Azarolus. } Leaves somewhat disfigured.
 ——— *v. Aronia.* }

———	Oxyacantha, <i>v. pyracanth.</i>	} Tops and leaves slightly injured.
———	——— <i>v. fruct. flav.</i>	
———	——— <i>v. fl. pleno.</i>	
———	——— <i>v. præcox.</i>	
———	——— <i>v. fl. rub.</i>	
———	parvifolia.	
———	flava.	
———	Crus-Galli, <i>v. pyricanth.</i>	
———	——— <i>v. splend.</i>	
———	——— <i>v. salicif.</i>	
———	torminalis.	

Amygdalus communis. } Leaves a little injured.
 ———— *v. chinens.* }
 ———— *v. sativ.* }

——— Perfica, *v. fruct. glab.* } Leaves a little injured.
 ———— *v. fruct. lanugin.* }
 ———— *v. fl. pleno.* }

——— orientalis. } Tops injured—orientalis safest.
 ——— nana. }
 ——— pumila. }

Mespilus germanica, *v. strict.*
 ——— *v. diffus.* } Tops injured, and leaves disfigured; the remaining *Mespiluses* tolerably safe.

Tilia europæa.—Young wood destroyed, and leaves disfigured.

—— *v. corall.*—From four to five inches, or nearly the entire of the young wood killed—budding on the former year's wood.

—— *v. parvifol.*—Shoots and leaves much disfigured; budding on the wood of the former year.

—— *americana*.—Shoots and leaves destroyed.

—— *pubescens*.—Buds destroyed; budding a fresh on the former year's wood.

—— *alba*.—Young wood destroyed; budding on the old.

Quercus Phellos, *v. virid.*
 ——— *v. sericea.* } Young wood, also the wood of the two former years killed—budding on the remaining wood.

—— *Ilex v. integri.*
 ——— *v. oblong.*
 ——— *v. ferrat.*
 ——— *aquatica, v. cunea.*
 ——— *v. heteroph.*
 ——— *v. elong.* } Young wood and shoots destroyed—budding on different years wood.

—— *Gramuntia.*
 ——— *Suber.* } First buds killed—budding anew.

—— *Coccifera*.—The entire buds killed—no appearance of any in succession.

—— *aquatica, v. cuneata.*
 ——— *v. attenuata.* } Dead.

—— *Prinus,*
 ——— *v. oblong.* } Most part of the two last year's wood killed—budding on the butts of the wood made in 1800.

—— *virens*.—Young wood destroyed—budding on the old.

Quercus

Quercus rubra. } Buds killed ; budding on the former year's wood—*v. coccinea* in a declining state.
 — *v. mont.* }
 — *v. coccinea.* }

— *discolor.*—Buds killed—budding a new.

— *Esculus.* } Buds killed, and leaves much disfigured ; a few successive buds in appearance.

— *Robur, v. pedunc.* } As above.
 — *v. sessilis.* }

— *v. fol. perennant.* } Buds partly escaped.
 — *v. fol. arg. var.* }

— *v. humilis.*—Buds destroyed ; a few in succession.

— *alba.*—Buds and the last year's wood killed—budding on the butt.

— *Cerris,* }
 — *v. bullat.* } Top shoots destroyed—
 — *v. fol. sub. glab.* } lower ones safe.
 — *v. sinuat.* }
 — *v. fol. pinnatif.* }
 — *v. fol. perennant.* }

Salisburia adiantifolia.—Buds nearly destroyed.

Juglans alba. }
 — *regia.* } Shoots destroyed—slowly budding on
 — *nigra.* } the wood of the two former years.
 — *cinerea.* }
 — *angustifolia.* }

Populus alba, } Shoots killed, and leaves disfigured.
 — *v. nivea.* }

— *tremula,* } Leaves disfigured.
 — *v. pend.* }

— *Chesteriensis.* } Tops injured, and leaves disfigured.
 — *dilatata.* } ed.

— *balsamifera,* } Leaves slightly injured.
 — *v. nova.* }
 — *candicans,* }

Populus

Betula Alnus.—Tops nipped.

—— *v. pinnatifid.*—Tops nipped, and leaves disfigured.

—— *oblongata*

—— *v. fol. ellipt.*

—— *sibirica*

—— *americana.*

} Slightly injured in their shoots.

—— *lenta.*—Shoots much injured, and leaves disfigured.

—— *incana*

—— *v. glauca.*

} Shoots and the last year's wood killed.

Pinus Pinafter

—— *Tæda*

—— *v. rigida.*

—— *v. variab.*

—— *v. alopecur.*

—— *Strobus*

} Leaves much injured.

—— *Cedrus*

—— *picea*

—— *Balsamea.*

} Shoots killed.

—— *canadensis*—Much injured.

—— *alba.*—Leaves partly injured.

—— *halepensis.*—Leaves injured.

Platanus occidentalis

—— *v. fol. sub. glab.*

—— *orientalis*

—— *v. undulatus et acerifolia.*

} Shoots killed ; budding on the last year's wood.

Morus alba.—Shoots killed with part of the last year's wood ; budding on the butts thereof.

—— *papyrifera.*—Shoots killed.

Fagus Castanea

—— *v. fol. attenuat.*

—— *v. fol. aur. var.*

} Shoots destroyed ; budding anew.

—— *sylvatica.*—Tops nipped.

—— *v. purp.*—Shoots killed.

Carpinus Betulus.—Tops severely hurt.

Carpinus

Carpinus Betulus, *v. fol. aur. var.*—Tops severely hurt.

——— *v. fol. incis.* }
 ——— *v. quercifolia.* } Tops slightly nipped.

——— *Ostrya* }
 ——— *virginiana,* } Partly nipped.

Corylus Avellana,
 ——— *v. glomerat.* }
 ——— *v. rubra.* }
 ——— *v. alb.* } Tops nipped.
 ——— *v. grandis.* }
 ——— *rostrata,* }
 ——— *Columna,* }

Iva frutescens.—Tops slightly nipped.

Buxus sempervirens, *v. fol. lanceol.*
 ——— *v. fol. aur. apice notata.* }
 ——— *v. fol. aur. var.* } Young wood de-
 ——— *baleaicus.* } stroyed.

Liquidamber Styraciflua.—Tops nipped.

Cupressus pendula.—Part of the last year's wood damaged.

——— *disticha.*—Tops severely nipped.

Thuja occidentalis, }
 ——— *orientalis,* } Tops much injured.

Jasminum officinale
 ——— *v. fol. aur. var.* }
 ——— *v. fol. arg. var.* } Shoots killed; budding
 on the butt of the former
 year's wood.

——— *humile.*—Many of the shoots nipped.

Phillyrea media,
 ——— *v. pend.* }
 ——— *v. olefol.* } Between one and two inches
 of the tops of the last year's wood
 killed.

——— *angustifolia.*—Much damaged.

——— *latifolia.*—Shoots partly nipped.

——— *v. spinosa.* }
 ——— *v. obliqua.* } Young wood, and part of the
 last year's, killed.

Chionanthus virginica,
 ——— *v. angust.* } Shoots killed.

Olea americana.—Shoots materially injured.

— *europæa*.—Seemingly killed.

Ligustrum vulgare,
— — — — — *et. var.* } Slightly nipped.

Syringa vulgaris, *v. americana*. }
— — — — — *persica*, *v. cærul.* } Flowers spoiled, and leaves
— — — — — *v. laciniat.* } disfigured.
— — — — — *v. alb.*

Veronica decussata.—Much injured in tops and leaves.

Salvia cretica.—Part of the old wood killed.

Rosmarinus officinalis,
— — — — — *v. fol. aur. var.* } Leaves disfigured.

Cneorum tricoccum.—Tops nipped.

Ilex Perado.—Young shoots killed ; none in succession.

— *Prinoides*, } Leaves and shoots much injured ; budding
— *vomitorea*, } on former year's wood.

— *opaca*.—Entire shrub much injured.

— *Cassine*,
— — — — — *v. angust.* } Shoots destroyed with part of the
— — — — — *v. dentata.* } last year's wood.
— — — — — *v. minor.*

— *aquifolium v. inermis*.—Flowers destroyed.

— — — — — *v. fruct. flav.*.—A great part of the two former
years wood killed.

Buddleia globosa.—Leaves much disfigured.

Plantago Cynops.—Old wood nearly killed ; young appearing
from the root.

Ptelea trifoliata.—From two to three inches of the last year's
wood killed.

Cornus florida,
— — — — — *v. fol. aur. var.* }
— — — — — *mascula*, } Shoots and leaves much
— — — — — *sanguinea*, } injured.
— — — — — *v. fol. aur. var.* }
— — — — — *sericea*,

Cornus

Cornus stricta, } Much injured in shoots and leaves; part
 — *alba*, } thereof killed.

— *alternifolia*, }
 — *v. ramis virid.* } Flowers destroyed.

— *paniculata*.—Flower-buds destroyed.

Eleagnus angustifolia.—Part of the last year's wood killed.

Viburnum Opulus, *v. americana*. }
 — *v. rosea*. } Tops slightly injured.
 — *dentatum*, *v. pubesc.* }

— *nitidum*.—Buds and leaves injured.

— *lævigatum*.—Shoots partly destroyed, and leaves injured.

— *Tinus*, *v. hirtum* }
 — *v. strict.* } Tops nipped.
 — *v. virgatum*. }
 — *v. fol. aur. mac.* }

— *v. fol. aur. var.* }
 — *prunifolium*, } Slightly injured in their
 — *Lentago*, } tops and leaves.
 — *Lonicera implexa*, }

— *Caprifolium*, *v. alb.*.—Most of the young wood killed.

— *dioica*.—Much disfigured.

— *Periclymenum*, } Flower buds destroyed;
 — *v. sarotina*. } ed; remaining *Lonicera*s a little disfigured in their leaves.

Celastrus scandens.—Shoots killed; budding on old wood.

Aralia spinosa.—Shoots destroyed.

Zanthorhiza apiifolium.—Shoots destroyed.

Itea virginica.—Shoots killed; budding on old wood.

Azalea viscosa, }
 — *v. fissa*. } Tops nipped.
 — *v. glauca*. }

— *v. floribunda*.—Shoots killed.

Azalea viscosa, *v. vittata*.—Shoots much injured, and leaves destroyed.

—	<i>nudiflora</i> , <i>v. phœnic.</i>	} Shoots and leaves destroyed ; budding on different parts of old wood.
—	— <i>v. carnea.</i>	
—	— <i>v. bicolor.</i>	
—	— <i>v. papilion.</i>	

<i>Vitis Labrusca</i> ,	} Shoots killed.
— <i>vinifera</i> ,	
— <i>vulpina</i> ,	
— <i>laciniosa</i> ,	
— <i>arborea</i> ,	
— <i>hederacea</i> ,	

Staphylea trifolia.—Tops of the last year's wood killed.

<i>Ribes rubrum</i> ,	} Fruit blasted, or as if it had been boiled.
— <i>album</i> ,	
— — <i>v. fol. arg. var.</i>	
— <i>nigrum</i> ,	
— <i>diacantha</i> ,	
— <i>floridum</i> ,	
— <i>Uva-crispa</i> ,	
— <i>Grossularia</i> ,	

<i>Rhus glabrum</i> ,	} Shoots all killed ; budding on their different parts.
— <i>Vernix</i> ,	
— <i>typhinum</i> ,	
— <i>elegans</i> ,	
— <i>Copallinum</i> ,	
— <i>suaveolens</i> ,	
— <i>Toxicodendron</i> ,	
— <i>radicans</i> , <i>v. lucidum</i> ,	
— <i>Coriaria</i> ,	
— <i>Cotinus</i> ,	

— *radicans* — Dead.

Rhamnus Frangula.—Shoots partly nipped.

— *Paliurus*.—Shoots destroyed ; budding on different years wood.

— *volubilis*.—Shoots killed ; budding anew.

Periploca græca — Shoots destroyed ; budding a fresh.

Hedera

- Hedera Helix*,
 ——— *v. fol. aur.* } Tops severely nipped.
- Berberis vulgaris*.—Fruit blasted.
 ——— *cretica*.—Tops nipped.
- Prinos verticillatus*, } Shoots and leaves destroyed; back-
 ——— *glaber*, } ward in budding.
- Daphne Tarton-raira*.—Tops severely nipped.
- Erica multiflora*,
 ——— *mediterranea*, } Tops nipped, and leaves slightly dis-
 ——— *didyma*, } gured.
- Vaccinium amœnum*,
 ——— *diffusum*,
 ——— *pallidum*,
 ——— *fuscatum*,
 ——— *Artoostaphylos*,
 ——— *frondosum*, } All nipped at top.
- *uliginosum*.—Dead.
- Laurus Sassafras*, } Shoots destroyed; budding on the last
 ——— *Benzoin*, } year's wood.
- *nobilis*.—Tops nipped.
- Cercis Siliquastrum*, } Shoots killed; budding on layers.
 ——— *canadensis*, }
- Kalmia angustifolia*,
 ——— *latifolia*, } Tops nipped; flower-buds injured.
 ——— *glauca*, }
- Sophora microphylla*.—Tops nipped.
- *japonica*.—Shoots killed; budding a new.
- *tetraptera*.—Tops and branches materially injured.
- Gualtheria procumbens*.—Much injured in tops.
- Ledum latifolium*.—Flower-buds destroyed.
- *palustre*.—Killed to the ground.
- ——— *v. decumbens*.—Much injured.

Andromeda

Andromeda Polifolia.

_____ *v. latif.* } Tops severely nipped.
 _____ *v. media.* }

_____ *v. angust.*—Flowers destroyed.

_____ calyculata. }
 _____ *v. angust.* } Tops nipped.

_____ *v. latif.*—Tops nipped, and flowers spoiled.

_____ paniculata.—Tops nipped.

_____ acuminata, }
 _____ coriacea, } Shoots and leaves injured.

Rhododendron ponticum.—Buds partly injured.

_____ dauricum, }
 _____ maximum, } Young wood destroyed.

Clethra paniculata, } Shoots destroyed, backward in budding;
 _____ alnifolia, } seemingly much injured.

Arbutus Unedo,

_____ *v. crisp.* }
 _____ *v. rubra.* } Tops partly nipped.
 _____ *v. pleno.* }
 _____ Andrachne,

Styrax lævigata.—Shoots killed; budding on the butt.

Hydrangea hortensis.—Shoots killed; budding on the butt.

_____ arborefcens.—Shoots nipped, and leaves disfigured.

Rosa sulphurea.—Dead.

_____ pimpinellifolia.—Flower buds destroyed. Tender leaves
 on the remaining roses slightly injured;
 such flower buds, as had made their
 appearance, disfigured.

Spiræa forbifolia.—Tops nipped.

_____ falcifolia, }
 _____ *v. carnea.* } Tops injured; part of the
 _____ *v. latif.* } two former years wood dead,—
 _____ *v. panicula.* } this I take to be the case each
 _____ *v. alb.* } year.

Spiræa

Spiræa tomentosa.—Tops nipped.

Philadelphus coronarius,
 ——— *nanus*, } Leaves injured.

Potentilla fruticosa.—Shoots slightly injured.

Calycanthus floridus,
 ——— *v. oblong.* } Shoots destroyed; bud-
Punica Granatum,
 ——— *v. fl. pleno.* } ding on different parts.

Rubus odoratus,
 ——— *fruticosus*, } Tops injured, partly nipped.
 ——— *v. alb.*
 ——— *v. plen.*

Liriodendron Tulipifera, }
Magnolia tripetala, } Shoots killed; budding a fresh.
 ——— *acuminata*, }
 ——— *glauca*.—Dead.

Clematis virginiana.—Tops nipped.

Fothergilla alnifolia, *v. acuta*. }
 ——— *v. obtus.* } Flowers destroyed.
 ——— *glauca*,

Phlomis fruticosa, *v. verbasci*.—Entire shrub nearly killed.

——— *purpurea*.—Entire shrub nearly killed.

Lavandula Spica,
 ——— *v. latif.* } Tops slightly injured.

Vitex Agnus-Castus, } Shoots destroyed; budding on
 ——— *v. latif.* } the butts of old wood.

Bignonia Catalpa.—Shoots destroyed; a few more appearing,
 seemingly shy.

Hibiscus syriacus,
 ——— *v. alb.* } Nipped in their shoots; budding on
 ——— *v. purp.* } different years wood.
 ——— *varieg.*

Robinia Pseud-Acacia.—Shoots partly injured; some destroyed.

——— *hispida*.—Shoots destroyed.

Coronilla

Coronilla valentina, }
 ——— *glauca*, } Leaves much disfigured.

———— *Emerus*.—Flowers spoiled.

Colutea cruenta.—Tops of the old wood suffered much.

———— *arborescens*.—Flowers spoiled, and leaves injured.

Glycine frutescens.—Young wood suffered much.

Spartium patens.—Tops nipped.

Lotus hirsutus.—Killed to the stem ; a few shoots safe thereon.

Genista germanica, }
 ——— *sagittalis*, } Killed.

———— *florida*.—Much of the last year's wood dead ; I remark it to be so every year.

Cytisus divaricatus.—Killed.

———— *sessilifolius*.—Flowers spoiled.

———— *biflorus*.—Tops of the last year's wood dead.

———— *supinus*, }
 ——— *purpureus*, } Flowers spoiled.

———— *argenteus*.—Tops nipped.

———— *hirsutus*.—Tops nipped.

———— *Laburnum*,
 ——— ——— *v. fol. aur. mac.* }
 ——— ——— *v. alpinum.* } Young wood nearly killed, and flowers spoiled.

Hypericum calycinum.—Tops nipped.

———— *Androsæmum*.—Tops nipped.

Passiflora cærulea.—Suffered much in their tops ; shooting a new from the roots.

Aristolochia sipho.—Shoots killed ; a succession from the butt.

Salix babylonica.—Shoots and leaves nearly destroyed ; a quantity of the former year's wood dead ; this I perceive to be the case yearly.

———— *variegata*.—Much injured in shoots and leaves. Remaining willows partly injured in leaves and shoots.

HERBACEOUS

HERBACEOUS PLANTS.

Urtica cylindrica.—Present growth killed.

Dioscorea villosa.—Tops nipped.

Datisca cannabina.—Tops and leaves destroyed.

Papaver Argemone.—Flower stems drooped.

Scandex odorata,
Smyrnum Olusatrum, } Stems much drooped.

Urtica dioica.—Tops nipped.

Circæa lutetiana, }
—— *alpina*, } Tops destroyed.

Solanum tuberosum.—Tops melted.

Chærophyllum sylvestre.—Tops nipped, and stems drooped.

Convolvulus tricolor.—Seedlings killed.

Ligusticum Levisticum.—Although four feet high, drooped to the ground.

Rheum palmatum.—Flower and flower stems destroyed.

Colinsonia canadensis.—Year's growth destroyed ; with many more of the herbaceous tribe, which caused them to make but a shabby appearance, during the remainder of the season.

APPENDIX,

TO THE

GENERAL CATALOGUE

IN VOL. II. PART. II.

CATALOGUE, FOR 1802.

OF PLANTS AND SEEDS,

RECEIVED AT THE

BOTANIC GARDEN

OF THE

RIGHT HONOURABLE THE DUBLIN SOCIETY.

SEVERAL parcels of seeds have been presented to the Society :
and as many of the names, as could be ascertained, are mentioned
in this Appendix, with the names of the Donors.

The letters before the name of the Plant denote the giver, viz.

Ld. L. for the Lord Lieutenant.
G. V. for General Vallancey.
C. B. for Colonel Balfour.
J. D. for James Donn, of Cambridge.

The letter after the Plant denotes what department it belongs to.

S. Stove.
G. Green-house.
H. Hardy.

CLASSIS II.

DIANDRIA MONOGYNIA.

JASMINUM	JASMINE
trinerve.	Three-nerved.—S.
gracile.	Slender.—G.
JUSTICIA	JUSTICIA
nitida.	Glossy.—S.
spinosa.	Thorny.—S.
VERBENA	VERVAIN
J. D. jamaicensis.	Jamaica.—S.
J. D. bonariensis.	Buenos-Ayres.—G.
SALVIA	SAGE
J. D. grandiflora.	Great-flowered.—G.
triloba.	Three-lobed.—G.
J. D. pomifera.	Apple.—G.
J. D. spinosa.	Thorny.—G.
J. D. tingitana.	Tangier.—G.
J. D. argentea.	Silvery.—H.

TRIGYNIA.

PIPER	PEPPER
obtusifolium.	Blunt-leaved.—S.
verticillatum.	Whorl-leaved.—S.
polytachyon.	Many-spiked.—S.

CLASSIS

CLASSIS III.

TRIANDRIA MONOGYNIA.

VALERIANA	VALERIAN.
J. D. cornucopiæ.	Purple.—H.
J. D. discoidea.	Hook-seeded.—H.
IXIA	IXIA.
patens.	Spreading-flowered.—G.
scillaris.	Squill-flowered.—G.
GLADIOLUS	CORN-FLAG.
recurvus.	Recurved-flowered.—G.
cuspidatus.	Pointed.—G.
brevifolius.	Short-leaved.—G.
iridifolius.	Sword-leaved.—G.
BABIANA	BABIANA.
plicata.	Sweet-scented.—G.
IRIS	IRIS.
tristis.	Dull-coloured.—G.
MORÆA	MORÆA.
C. B. plicata.	Plaited.—S.
CENCHRUS	CENCHRUS.
J. D. echinatus.	Rough-seeded.—S.
J. D. ciliaris.	Ciliated.—S.

DIGYNIA

DIGYNIA.

PANICUM	PANIC-GRASS.
Crus-corvi.	Crow's-foot.—S.
Poa	Poa.
J. D. capillaris.	Hair.—S.
J. D. badensis.	Baden.—H.
J. D. ciliaris.	Ciliated.—S.
hibernica.	Irish.
stricta.	Close-headed. } New species
erecta.	Upright. } found in Ire-
CYNOSURUS	DOG'S-TAIL-GRASS.
J. D. coracanus.	Thick-spiked.—S.

TRIGYNIA.

QUERIA	QUERIA.
J. D. canadensis.	Canadian.—H.
ERIOCAULON	PIPE-WORT.
Septangulare.	Seven-angled.—S.

CLASSIS IV.

TETRANDRIA MONOGYNIA.

BANKSIA	BANKSIA.
pyriformis.	Pear-fruited.—G.
PENÆA	PNEÆA.
• Myrtoides.	Myrtle-leaved.—G.
SCOPARIA	SCOPARIA.
J. D. dulcis.	Sweet.—S.
OLDENLANDIA	OLDENLANDIA.
Ld. L. biflora.	Two-flowered.—S.
STRUTHIOLA	STRUTHIOLA.
virgata.	Twiggy.—G.
erecta.	Upright.
POTHOS	POTHOS.
acaulis.	Stemless.—S.

CLASSIS V.

PENTANDRIA MONOGYNIA.

AZALRA	AZALEA.
indica.	Indian.—S.
CONVOLVULUS	BIND-WEED.
G. V. Medium.	Arrow-headed.—S.
Speciosus.	Broad-leaved.—S.
Ld. L. paniculatus.	Panicled.—S.
Ld. L. repens.	Creeping.—S.
IPOMOEA	IPOMOEA.
Ld. L. bona-nox.	Prickly-stalked.—S.
LOBELIA	LOBELIA.
Surinamensis.	Surinam.—S.
DATURA	THORN-APPLE.
J. D. ferox.	Rough.—S.
SOLANUM	NIGHT-SHADE.
macrocarpon.	Great-fruited.—S.
J. D. radicans.	Climbing.—G.
J. D. campechiense.	Purple-spined.—S.
CAPSICUM	CAPSICUM.
frutescens.	Shrubby.—S.
CHIRONIA	CHIRONIA.
latifolia.	Broad-leaved.—G.
PHYLICA	PHYLICA.
plumosa.	Feathered.—G.

DIOSMA	DIOSMA.
hirsuta.	Hairy.—G.
pulchella.	Oval-leaved.—G.
BRUNIA	BRUNIA.
fragaroides.	Small-leaved.—G.
LEEA	LEEA.
Ld. L. æquata.	Shrubby.—S.
G. V. crispa.	Fringe-stalked.—S.
HELICONIA	HELICONIA.
humilis.	Dwarf.—S.
ACHYRANTHUS	ACHYRANTHUS.
G. V. aspera.	Harsh.—S.
G. V. muricata.	prickly.—S.
ILLECEBRUM	ILLECEBRUM.
lanatum.	Woolly.—S.
capitatum.	Headed.—H.
GARDENIA	GARDENIA.
latifolia.	Broad-leaved.—S.
ECHITES	ECHITES.
suberecta.	Oval-leaved.—S.
PLUMERIA	PLUMERIA.
subra.	Red.—S.

DIGYNIA.

ERYNGIUM	ERYNGO.
aquaticum.	Marsh.—G.
CAUCALIS	CAUCALIS.
J. D. grandiflora.	Great-flowered.—H.
	platycarpus.

J. D. platycarpus.

Rough-seeded.—H.

ÆTHUSA

FOOL'S-PARSLEY.

J. D. Bunius.

Coriander-leaved.—H.

TRIGYNIA.

XYLOPHYLLA

XYLOPHYLLA.

falcata.

Sickle-leaved.—S.

BASELLA

BASELLA.

Ld. L. lucida.

Shining.—S.

PENTAGYNIA.

ARALIA

ARALIA.

capitata.

Head-flowering.—S.

LINUM

FLAX.

arboreum.

Tree.—G.

quadrifolium.

Four-leaved.—G.

CRASSULA

CRASSULA.

obvallata.

House-leek-leaved.—G.

spathulata.

Crenated.—G.

CLASSIS VI.

HEXANDRIA MONOGYNIA.

BROMELIA	PINE-APPLE.
Ananas	Cultivated.—S.
HÆMANTHUS	BLOOD-FLOWER.
pubescens.	Downy.—G.
spiralis.	Spiral-stalked.—G.
MASSONIA	MASSONIA.
scabra.	Rough.—G.
AMARYLLIS	AMARYLLIS.
G. V. zeylanica.	Ceylon.—S.
G. V. latifolia.	Broad-leaved.—S.
GETHYLLIS	GETHYLLIS.
ciliaris.	Fringed.—G.
plicata.	Plaited-leaved.
DRACÆNA	DRACÆNA.
umbraculifera.	Cluster-flowered.—S.
LACHENALIA	LACHENALIA.
punctata.	Dotted.—G.
EHRHARTA	EHRHARTA.
J. D. panica.	Panicled.—G.

CLASSIS

CLASSIS VIII.

OCTANDRIA MONOGYNIA.

TROPÆOLUM	INDIAN-CRESS.
hybridum.	Bastard.—G.
ORNITROPHE	ORNITROPHE.
G. V. ferrata.	Saw-leaved.—S.
MIMUSOPS	MIMUSOPS.
Ld. L. Elengi.	Sweet-scented.—S.
LAWSONIA	LAWSONIA.
G. V. inermis.	Smooth.—S.
ERICA	HEATH.
lutea.	Yellow.—G.
depressa.	Depressed.—G.
Monsoniana.	Monson's.—G.
planifolia.	Thyme-leaved.—G.
articularis.	Jointed.—G.
multicaule.	Many-stalked.—G.
Capax.	Capacious.—G.
Patterfonia.	Patterfson's.—G.
Pyxidiflora.	Tiled.—G.
plumosa.	Feathered.—G.
calycina.	Wheel-cupped.—G.
quadriflora.	Four-flowered.—G.
lateralis.	Lateral-flowered.—G.
albens.	Whitish.—G.
petiolata.	Rosemary-leaved.—G.
	imbricata.

<i>imbricata.</i>	Imbricated.—G.
<i>sexfaria.</i>	Six-angled.—G.
<i>Bruniades.</i>	Brunia-leaved.—G.
<i>perspicua.</i>	Woolly-tubed.—G.
<i>pinea.</i>	Pine-leaved.—G.
<i>Archeria.</i>	Archer's.—G.
<i>exurgens.</i>	Prickly-leaved.—G.
<i>formosa.</i>	Beautiful.—G.
<i>flammea.</i>	Flame-flowered.—G.
<i>daphnæflora.</i>	Daphne-flowered.—G.
<i>retorta.</i>	Recurved-leaved.—G.
<i>campanulata.</i>	Bell-flowered.—G.
<i>cubica.</i>	Cube-flowered.—G.
<i>pyramidalis.</i>	Pyramidal.—G.
<i>spuria.</i>	Spurious.—G.
<i>Melastoma.</i>	Black-Anthered.—G.
<i>denticulata.</i>	Toothed.—G.
<i>Decora.</i>	Fashionable.—G.
<i>rubens.</i>	Red-flowered.—G.
<i>erecta.</i>	Upright.—G.
<i>affurgens.</i>	Ascending.—G.
<i>axillaris.</i>	Arm-flowered.—G.
<i>quadrata.</i>	Four-sided —G.
<i>ovata.</i>	Oval-flowered.—G.
GNIDIA	GNIDIA.
<i>oppositifolia.</i>	Opposite-leaved.—G.
LACHNÆA	LACHNÆA.
<i>Eriocephala.</i>	Woolly-flowered.—G.

CLASSIS

CLASSIS X.

DECANDRIA MONOGYNIA.

	PODALYRIA	PODALYRIA.
	genistoides.	Genista-leaved.—G.
	CASSIA	CASSIA.
G. V.	Tora.	Oval-leaved.—S.
	GUILANDINA	NICKER-TREE.
	Zygophillum.	Bean-caper.
	sessilifolium.	Sessile-leaved.—G.
	QUASSIA	QUASSIA.
	amara.	Bitter.—S.
	LIMONIA	LIMONIA.
C. B.	trifoliata.	Three-leaved.—S.
	MELASTOMA	MELASTOMA.
	malabathrica.	Black-strawberry.—S.
G. V.	Bonduc.	Yellow-seeded.—S.

Our Bonduc was raised from seed picked up on the coast of Ireland, and sent to the garden by General VALLANCEY, 1801.

DIGYNIA.

	TRIANTHEMA	TRIANTHEMA.
G. V.	monogyna.	Purflain-leaved.—S.
	GYPHOPHILA	GYPHOPHILA.
J. D.	altissima.	Tall.—H.
	SAPONARIA	SOAP-WORT.
	orientalis.	Small-flowered.—H.

TRIGYNIA.

TRIGYNIA.

MALPIGHIA
tuberculata.

MALPIGHIA.
Rough-stemmed.—S.

PENTAGYNIA.

OXALIS
incarnata.
repens.

WOOD-SORREL.
Flesh.—G.
Creeping.—G.

DECAGYNIA.

PHYTOLACCA
J. D. octandra.

PHYTOLACCA.
White-flowered.—S.

CLASSIS XI.

DODECANDRIA MONOGYNIA.

CRATÆVA
gynandra.

CRATÆVA.
Thin-leaved.—S.

STERCULIA
Balanghas.

STERCULIA.
Laurel-leaved.—S.

TRIGYNIA.

EUPHORBIA
antiquorum.

SPURGE.
Triangular.—S.

SEMPERVIVUM
cuspidatum.
stellatum.

HOUSE-LEEK.
Pointed.—G.
Starry.—G.

CLASSIS

CLASSIS XII.

ICOSANDRIA MONOGYNIA.

PHILADELPHUS	PHILADELPHUS.
inodorus.	Carolinian.—H.
PUNICA	POMEGRANATE.
<i>v. alba.</i>	White.—G.
<i>v. chinensis.</i>	Chinefe.—G.

CLASSIS XIII.

POLYANDRIA MONOGYNIA.

CAPPARIS	CAPER-BUSH.
mariana.	Heart-leaved.—S.
SPARRMANNIA	SPARRMANNIA.
africana.	Angular-leaved.—G.
CISTUS	CISTUS.
formosus.	Beautiful.—G.
Fumana.	Heath-leaved.—G.
lævipes.	Larch-leaved.—G.
NYMPHÆA	NYMPHÆA.
Ld. L. Lotus.	Ægyptian.

POLYGYNIA.

NELUMBium	NELUMBium.
Ld. L. Speciosum.	Shewy.—S.

CLASSIS

CLASSIS XIV.

DIDYNAMIA GYMNOSPERMIA.

LAVANDULA	LAVENDER.
pinnata.	Wing-leaved.—G.
PHLOMIS	PHLOMIS.
J. D. nepetifolia.	Catmint-leaved.—S.

ANGIOSPERMIA.

ANTIRRHINUM	TOAD-FLAX.
triste.	Dark-flowered.—G.
reticulatum.	Reticulate.—G.
molle.	Soft.—G.
ANARRHINUM	ANARRHINUM.
J. D. bellidifolium.	Daify-leaved.—H.
BESLERIA	BESLERIA.
melittifolia.	Melittis-leaved.—S.
SCROPHULARIA	FIG-WORT.
J. D. mellifera.	Honey-bearing —G.
DIGITALIS	FOX-GLOVE.
J. D. lanata.	Woolly.—H.
BIGNONIA	TRUMPET-FLOWER.
flans.	Branching-flowered.—S.
SPIELMANIA	SPIELMANIA.
africana.	Ilex-leaved.—G.
SELAGO	SELAGO.
fasciculata.	Cluster-flowered.—G.

Buchnera.

BUCHNERA
viscosa.
SESAMUM
G. V. orientale.

BUCHNERA.
Clammy.—G.
OILY-GRAIN.
Eastern.—S.

CLASSIS XV.

TETRADYNAMIA SILICULOSA.

CRAMBE
J. D. filiforme.
ISATIS
J. D. lusitanica.

COLE-WORT.
Slender.—H.
WOAD.
Portugal.—H.

SILICUOSA.

CARDAMINE
J. D. græca.
SISYMBRIUM
millefolium.
J. D. eckartsbergense.
HESPERIS
J. D. inodora.
ARABIS
nutans.
BRASSICA
G. V. chinense.

LADY'S-SMOCK.
Grecian.—H.
SISYMBRIUM.
Milfoil-leaved.—G.
Rough-leaved.—H.
ROCKET.
Scentless.—H.
WALL-CRESS.
Nodding.—H.
CABBAGE.
China.—H.

CLASSIS

CLASSIS XVI.

MONADELPHIA PENTANDRIA.

HERMANNIA	HERMANNIA.
cuneifolia.	Wedge-leaved.—G.
PASSIFLORA	PASSION-FLOWER.
rubra.	Red-fruited.—S.
ciliata.	Ciliated.—S.
ERODIUM	HERON'S-BILL.
J. D. involucratum.	Various-leaved.—G.
J. D. malopoides.	Trailing.—G.

HEPTANDRIA.

PELARGONIUM	STORK'S-BILL.
melananthon.	Dark-flowered.—G.
ovale.	Oval-leaved.—G.
blattarium.	Downy-leaved.—G.
Saniculæfolium.	Sanicle-leaved.—G.
patulum.	Spreading.—G.
reniforme.	Kidney-leaved.—G.
maculosum.	Spotted.—G.
balsameum.	Balm-scented.—G.
fragrans.	Fragrant.—G.
tripartitum.	Trifid-leaved.—G.
penicillum.	Painted.—G.
	citriodorum.

citriodorum.	Lemon-scented.—G.
quercifolium.	Oak-leaved.—G.
speciosum.	Shewy.—G.
columbinum.	Dove's-foot.—G.

DODECANDRIA.

PTEROSPERMUM	PTEROSPERMUM.
Ld. L. fuberifolia.	Angle-leaved.—S.

POLYANDRIA.

ADANSONIA	SOUR-GOURD.
Ld. L. digitata.	Digitated.—S.
SIDA	SIDA.
Ld. L. alnifolia.	Alder-leaved.—S.
Ld. L. lanceolata.	Lance-leaved.—S.
jatrochoides.	Jatropha-leaved.—S.
HIBISCUS	HIBISCUS.
phœniceus.	Small-flowered.—S.
Ld. L. sabdariffa.	Various-leaved.—S.
G. V. populneus.	Poplar-leaved.—S.
J. D. hispidatus.	Hairy-stalked.—S.
J. D. vitifolius.	Vine-leaved.—S.

CLASSIS XVII.

DIADELPHIA OCTANDRIA.

POLYGALA

oppositifolia.

MILK-WORT.

Opposite-leaved.—G.

DECANDRIA.

PISCIDIA

Erythrina.

BORBONIA

villosa.

CROTALLARIA

elegans.

G. V. retusa.

J. D. laburnifolia.

ARACHIS

G. V. hypogæa.

DOLICHOS

J. D. Soja.

J. D. biflorus.

GLYCINE

angustifolia.

PISUM

J. D. arvense.

PISCIDIA.

Erythrina-leaved.—S.

BORBONIA.

Hairy-leaved.—G.

CROTALLARIA.

Scarlet-flowered.—G.

Blunt-leaved.—S.

Laburnum-leaved.—S.

EARTH-NUT.

American.—S.

DOLICHOS.

Soy.—S.

Two-flowered.—S.

GLYCINE.

Narrow-leaved.—G.

PEA.

Wild.—H.

HEDYSARUM

HEDYSARUM	HEDYSARUM.
G. V. styracifolium.	Storax-leaved.—S.
G. V. pulchellum.	Delicate.—S.
G. V. pictum.	Painted.—S.
gracilis.	Slender.—S.
INDIGOFERA	INDIGO.
Ld. L. tinctoria.	Dyer's.—S.
GALEGA	GALEGA.
G. V. purpurea.	Purple.—S.
PSORALEA	PSORALEA.
hirta.	Hairy.—G.
odoratissima.	Sweet-scented.—G.

 CLASSIS XVIII.

POLYADELPHIA PENTANDRIA.

ABROMA	ABROMA.
G. V. angusta.	Maple-leaved.—S.

POLYANDRIA.

MELALEUCA	MELALEUCA.
thymifolia.	Thyme-leaved.—G.
SMYTHIA	SMYTHIA.
Ld. L. sensitiva.	Sensitive.—S.

 CLASSIS XIX.

SYNGENESIA POLYGAMIA ÆQUALIS.

CICHORIUM	ENDIVE.
[D. divaricatum.	Divaricated —H.
	ATHAMASIA

CATALOGUE.

131

ATHANASIA

incana.

australis.

ATHANASIA.

Hoary-leaved.—G.

Southern.—G.

POLYGAMIA SUPERFLUA.

GNAPHALIUM

congestum.

ASTER

reflexus.

tenellus.

TAGETES

lucida.

COTULA

coronopifolia.

EVERLASTING.

Close-headed.—G.

STAR-WORT.

Reflex-leaved.—G.

Dwarf.—G.

TAGETES.

Shining-leaved.—G.

COTULA.

Buck's-horn.—G.

CLASSIS XX.

GYNANDRIA DIANDRIA.

EPIDENDRUM

ruscifolium.

EPIDENDRUM.

Ruscus-leaved.—S.

PENTANDRIA.

AYENIA

J. D. pusilla.

AYENIA.

Small.—S.

HEXANDRIA.

ARISTOLACHIA

G. V. indica.

BIRTH-WORT.

Indian.—S.

x 2

grandiflora.

grandiflora.	Great-flowered.—S.
glauca.	Glaucous-leaved.—S.

POLYANDRIA.

DRACONTIUM	DRAGON.
pertusum.	Perforated.—S.
nymphæfolia.	Water-Lily-leaved.—S.

CLASSIS XXI.

MONŒCIA TRIANDRIA.

TRIPSACUM	TRIPSACUM.
hermaphroditicum.	Hermaphrodite.—S.

MONADELPHIA.

CROTON	CROTON.
digitatum.	Digitated.—S.
JATROPHA	PHYSIC-NUT.
Curcas.	Angular-leaved.—S.

SYNGENESIA.

CUCUMIS	CUCUMBER.
Ld. L. acutangulus.	Acute-angled.—S.

CLASSIS XXII.

DICECIA DIANDRIA.

CECROPIA	CECROPIA.
peltata.	Peltated.—S.

PENTANDRIA.

CATALOGUE.

133

PENTANDRIA.

ANTIDESMA	ANTIDESMA.
G. V. alexiteria.	Laurel-leaved.—S.

HEXANDRIA.

DIOSCORIA	DIOSCORIA.
alata.	Wing-stalked.—S.

POLYANDRIA.

CLIFFORTIA	CLIFFORTIA.
linearis.	Linear-leaved.—G.

GYNANDRIA.

CLUYTIA	CLUYTIA.
polifolia.	Cluster-leaved.—G.
glabra.	Smooth-leaved.—G.

CLASSIS XXIII.

POLYGAMIA MONŒCIA.

MUSA	MUSA.
paradifica.	Plantain.—S.
ANDROPOGON	ANDROPOGON.
G. V. fasciculatum.	Many-spiked.—S.
G. V. aromaticum.	Aromatic.—S.
ÆGILOPS	HARD-GRASS.
J. D. squarrosa.	Rough-spiked.—H.
CLUSIA	BALSAM-TREE.
rosea.	Rose-flowered.—S.

flava.

flava.

Yellow-flowered.—S.

MIMOSA

MIMOSA.

G. V. natans.

Floating.—S.

G. V. glauca.

Glaucous.—S.

DICECIA.

ANTHOSPERMUM.

AMBER-TREE.

æthiopicum.

Heath-leaved.—G.

SIR,

TO GENERAL VALLANCEY, V. P.

SIR,

Agreeable to your orders of the 4th day of March last, I proceeded to select the best looking of the Potatoes, that were produced from the seed sowed in the spring of 1801.

And on the 17th day of March I planted, as I then thought, seventeen different sorts, but this year they have not come true to the sorts I then planted.

No. lb. Planted.

1	1½	May 4, up.
2	3	May 8, up.
3	1	May 7, up.
4	1	May 6, up.
5	1	May 9, up.
6	2	May 4, up.
7	1½	May 8, up.
8	1½	May 8, up.
9	1½	May 8, up.
10	1	May 8, up.
11	2	May 9, up.
12	3	May 9, up.
13	1	May 4, up.
14	1½	May 10, up.
15	1½	} May 10, up.
16	1½	
17	1½	
19	1 40	in number not cut.
19	1 20	in numb. cut in two.
20	1 10	in numb. cut in four.
2	stone of Horse-legs.	

May 14th, the frost killed all the young shoots, and about the 27th, they began to come up again; but little rain this month, I. o. 75. parts.

June 5.

In general about two inches.

June 12.

In general about four inches; fine rain.

June 19.

The growth this week about three inches; some fine showers at times.

June 26.

The growth this week about two inches; rain falling this month one inch, 63 parts.

July 3.

The growth this week about two inches, and coming in to blossom.

No.

Of the Potatoes planted on the 17th day of March, 1802.

- No. 1. July 3 & 24, appearing very bad, and curled, July 24.
2. July 3 appearing good, very few curled.
3. July 3 appearing weak, and curled.
4. July 3 appearing weak, and much curled.
5. July 3 appearing good, very few curled.
6. July 3 appearing very good.
7. July 3 appearing very good.
8. July 3 appearing very good.
9. July 3 appearing very good.
10. July 3 appearing very weak, many did
not come up.
11. July 3 appearing weak, and much curled.
12. July 3 appearing the very best of all.
13. July 3 appearing good.
14. July 3 appearing good.
15. July 3 appearing good.
16. July 3 appearing good.
17. July 3 appearing weak.
18. July 3 appearing very good.
19. July 3 appearing weak.
20. July 3 appearing weak and curled.
Horse-legs, July 3 appearing very good and strong.

Those Observations were made July 3d. and 24th.

8lb. of the Scruffle Potatoe planted the 27th day of April.

May 26th.—They were beginning to come up.

June 5th.—They were about two inches high, earthed them up.

June 12th.—They were about eight inches high, earthed them second time.

June 19th.—They had grown about six inches this week, third earthing, and coming to blossom.

June 26th.—They had grown about five inches this week.

July 3d.—They had grown about four inches this week.

July 24th.—Appearing very good and strong.

The rain falling this month, four inches, 42 parts.

No.	lb. Planted.	Produce.			
		Cwt.	St.	lb.	oz.
1	1 $\frac{1}{2}$ White, some round, some long,	0	3	7	5
2	3 Most like a white eye,	1	4	0	0
3	1 Not unlike the apples,	0	3	9	8
4	1 Rough skinned blacks,	0	2	11	8
5	1 Smooth skinned blacks,	0	7	4	8
6	2 Black red colour, eyes lighter,	0	6	13	1
7	1 $\frac{1}{2}$ Like the last, but eyes dark,	0	8	12	10
8	1 $\frac{1}{2}$ Between an apple and a black,	0	7	3	0
9	$\frac{1}{2}$ Inclined most to a black,	0	2	2	4
10	1 Many eyed, long black,	0	1	11	3
11	2 Round black purple,	0	3	9	6
12	3 Eyes with streaks of purple,	0	7	6	0
13	1 Very like the last colour,	0	4	0	14
14	$\frac{1}{2}$ Colour more dark than the last	0	1	10	10

No.

		<i>Produce.</i>				
<i>No.</i>	<i>lb. Planted.</i>	<i>Cwt.</i>	<i>St.</i>	<i>lb.</i>	<i>oz.</i>	
15	One small row, $\frac{1}{2}$	Apples, white eyes, red, black, and I do not know the different colours.	0	0	9	8
16	One small row, $\frac{1}{2}$		0	0	7	0
17	One small row, $\frac{1}{2}$		0	0	10	8
		<i>lb.</i>				
18	Forty in number not cut,	1	0	3	7	10
19	Twenty cut in two,	1	0	2	10	4
20	Ten cut in four,	1	0	1	12	13
Horse-legs, two stone,			9	2	0	0
Scuffle, 8lb.			4	3	1	8

Be pleased to give me your order, what I am to do with them; it will be impossible to judge of their merit, this year, as they were covered with water for three days, before they were taken up.

I am, Sir,

Your most obedient,

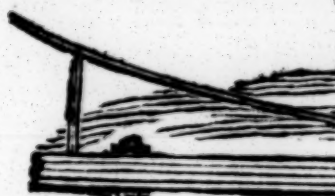
Humble Servant,

JOHN UNDERWOOD.

Botanic Garden,

December 1802.

A. Chain p
excellent in cu

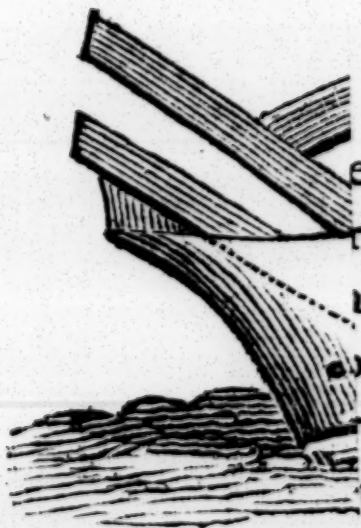


Screw.

any drawing of Mr. Ducket's
one in use here; it is light and
not quite three quarters of a
with iron muzzle, chain coul-
flock, and side lining; it is a re-
ugh, and will turn a very deep
sily held, as I have proved my-
r share screwing on is an im-
he coulter should likewise screw
e line of draught and muzzle,
g into general use. It will not
bble or foul ground.

Length of b

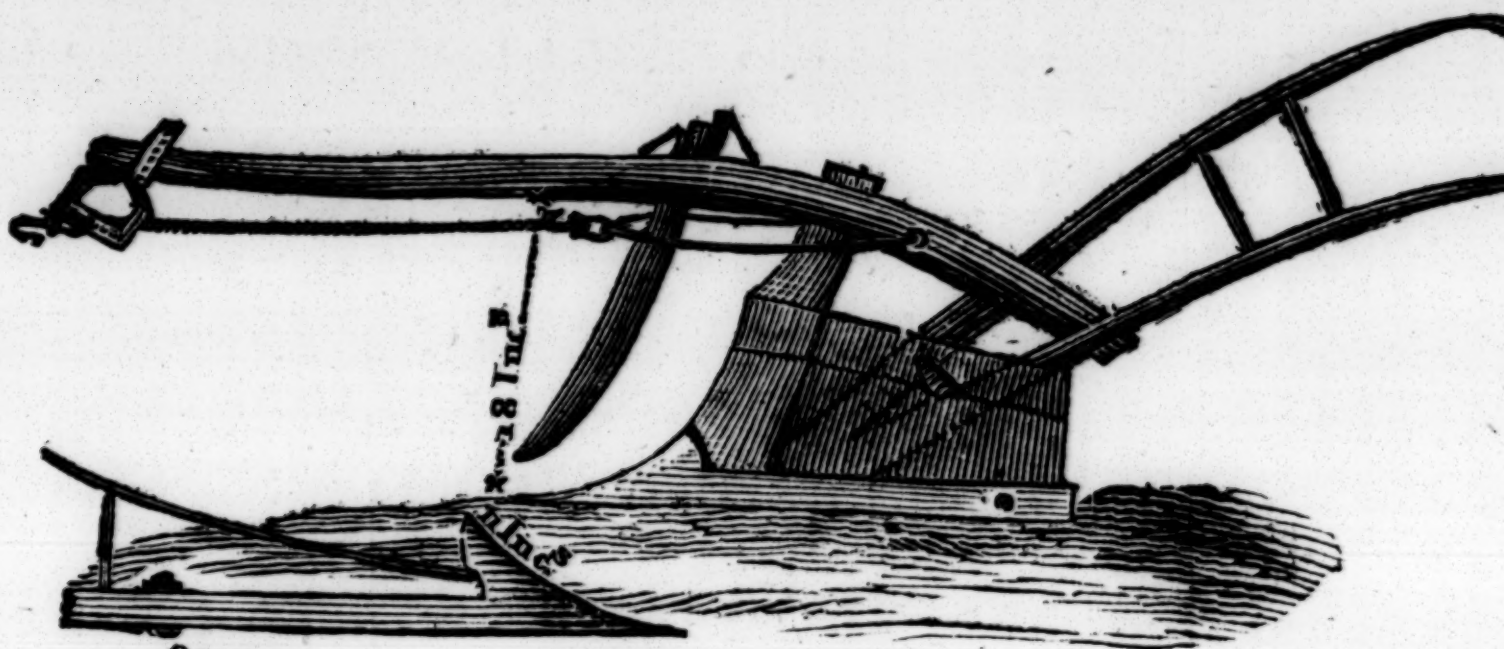
B.



is considerably higher from the
beam than A, and so must all
e the skim is used. I do not re-
rior of Ducket's plough, and fear
the skim, though I have one be-
believe there is so much nicety in
oper bend, that I would recom-
them from Ducket's smith at

Near

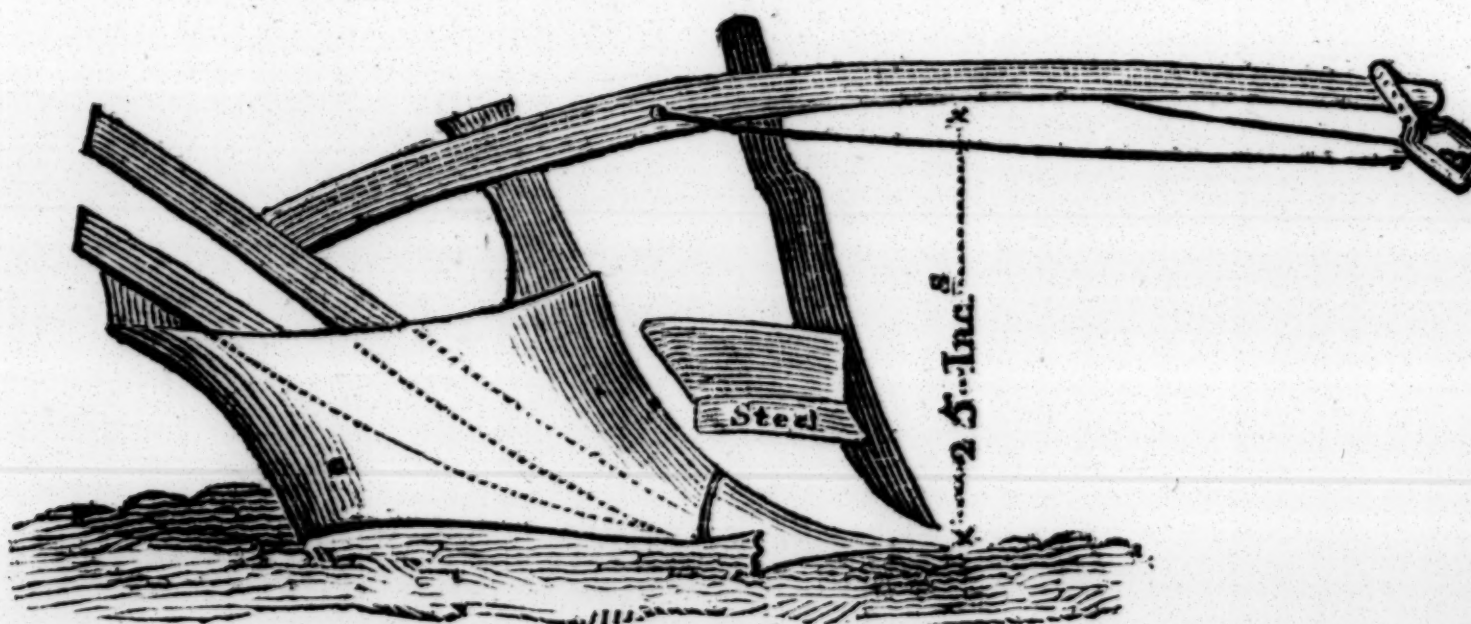
A. Chain plough used at Westmead, with one or two horses, and excellent in cultivated land, with Small's line of draught.



Screw.

Length of beam, 6 feet 3 inches. Length of fock, 2 feet 8 inches

B. Ducket's Beam, Bridle, and Skim Coulter.



Nearly front view of the Coulter and Skim.



and

Not having any drawing of Mr. Ducket's ploughs, I give one in use here; it is light and strong, weighing not quite three quarters of a hundred weight, with iron muzzle, chain coulter, mold board, sock, and side lining; it is a remarkably stiff plough, and will turn a very deep furrow, and is easily held, as I have proved myself; the sock or share screwing on is an improvement, and the coulter should likewise screw to the beam; the line of draught and muzzle, I hope, is creeping into general use. It will not answer in high stubble or foul ground.

inches.



18 inches.

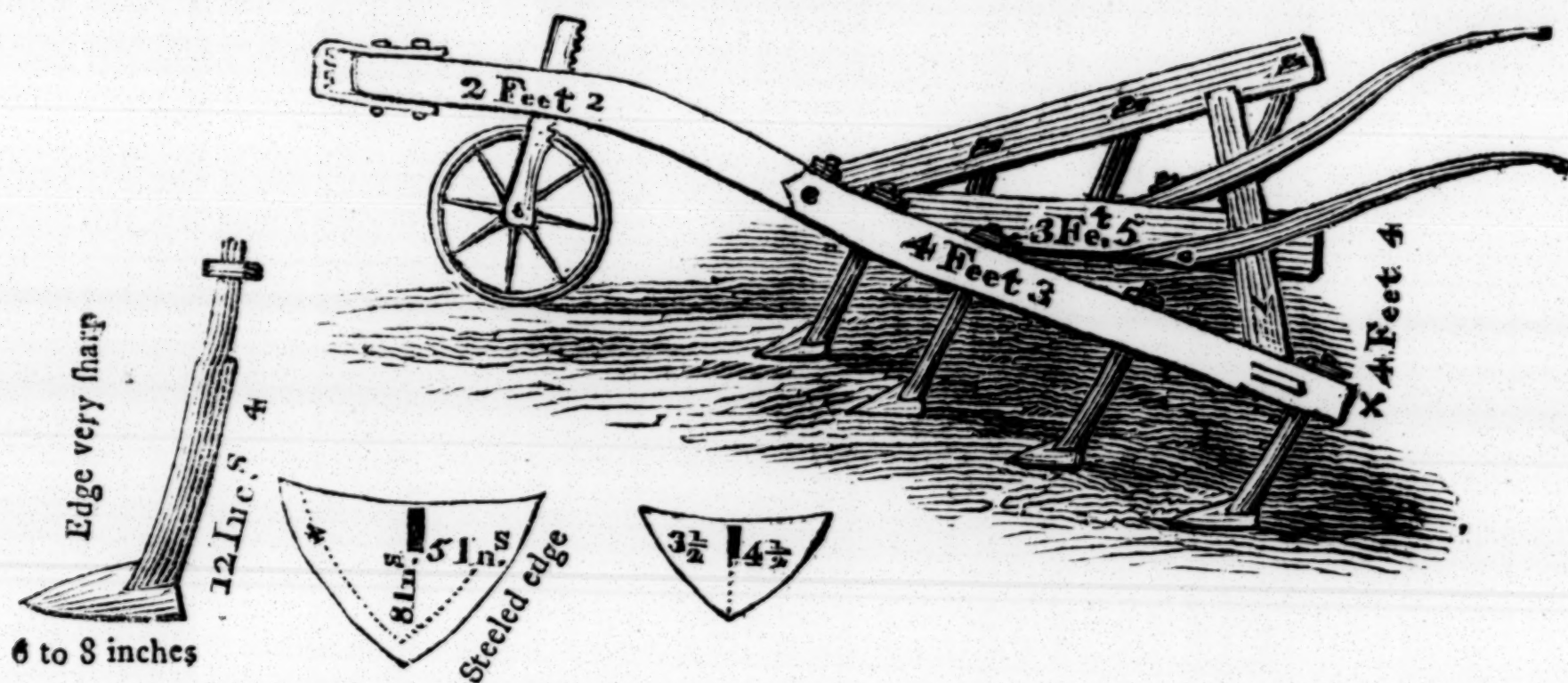
Coulter 16

This plough is considerably higher from the ground to the beam than A, and so must all ploughs, where the skim is used. I do not recollect the interior of Ducket's plough, and fear I but ill explain the skim, though I have one before me, but believe there is so much nicety in giving it the proper bend, that I would recommend getting them from Ducket's smith at Esher.

BREADTH OF HOES AT WESTMEAD.

			<i>Ft.</i>	<i>In.</i>	
Front hoe,	-	-	-	6	
2 of 7 inches,	-	-	1	2	
2 of 8 inches,	-	-	1	4	} These four are widened, principally on the outside, to encrease the breadth when moved forward.
2 of 9 inches,	-	-	1	6	
Entire length of beam,	-	-	4	6	

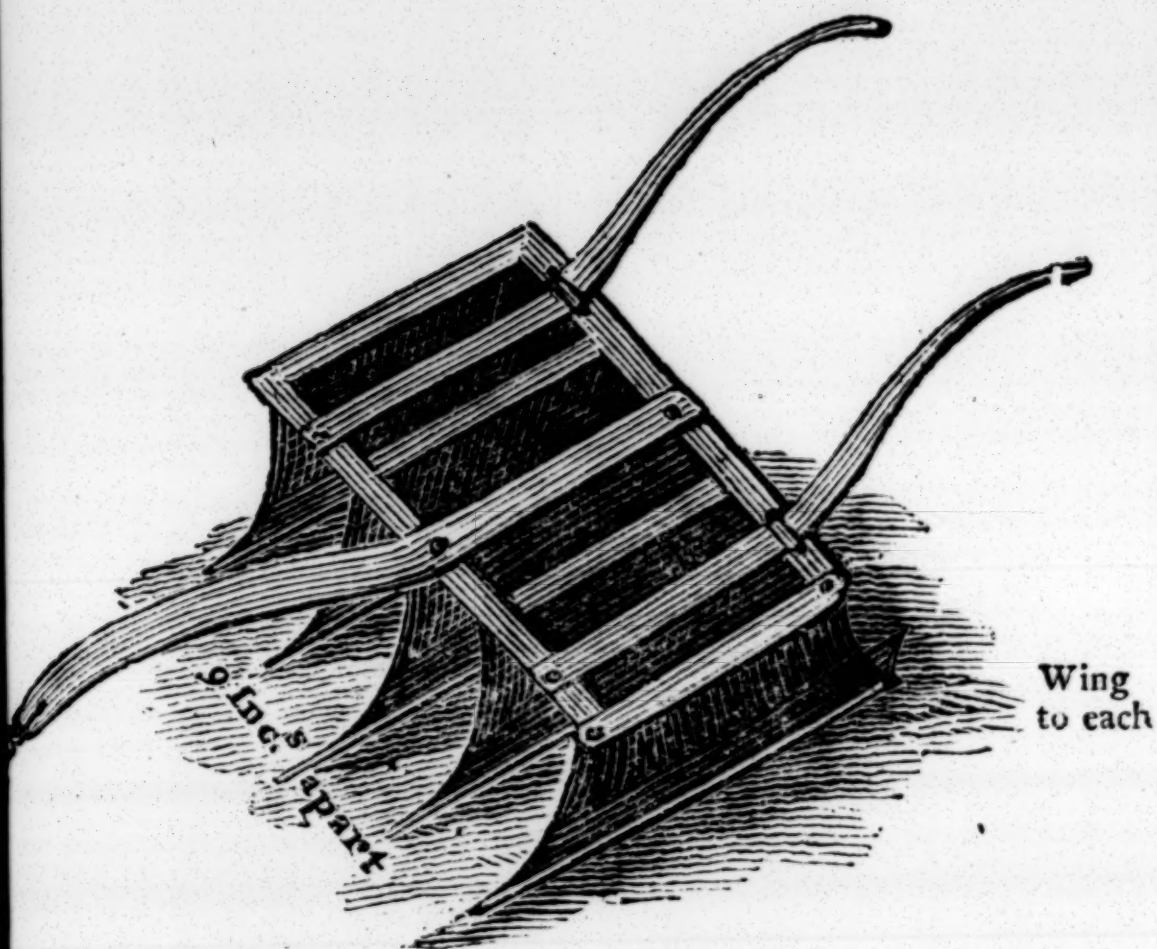
Scuffler, C.



C. Mr. Ducker's scuffler being connected with his horse-hoe, that is, using the same fore-carriage and wheels, I do not give the plan of his, which consists of an oblong square frame-work of wood, with two hoes before, and three behind, of above eleven inches broad. I sent one to *Mr. Symes of Ballyarthur* last summer, from London, upon nearly the principle of this plan now given, but that the sides expanded, and slid upon the cross-flat V, which was circular; but, as I consider the opposition it is likely to meet in ground some months ploughed, I have made up one the same as this plan, strong and firmly pinned down; and, instead of seven hoes of eight inches, have made the seven hoes wider as they get towards the handles, the narrow hoes meeting the first opposition; besides, as I work mine where the cultivator has not sufficient force, 2, 3, and 4 hoes taking out the rest, between rows of lucerne, carrots, &c., it is convenient to me to have the hoes of different sizes, to answer the breadth required.

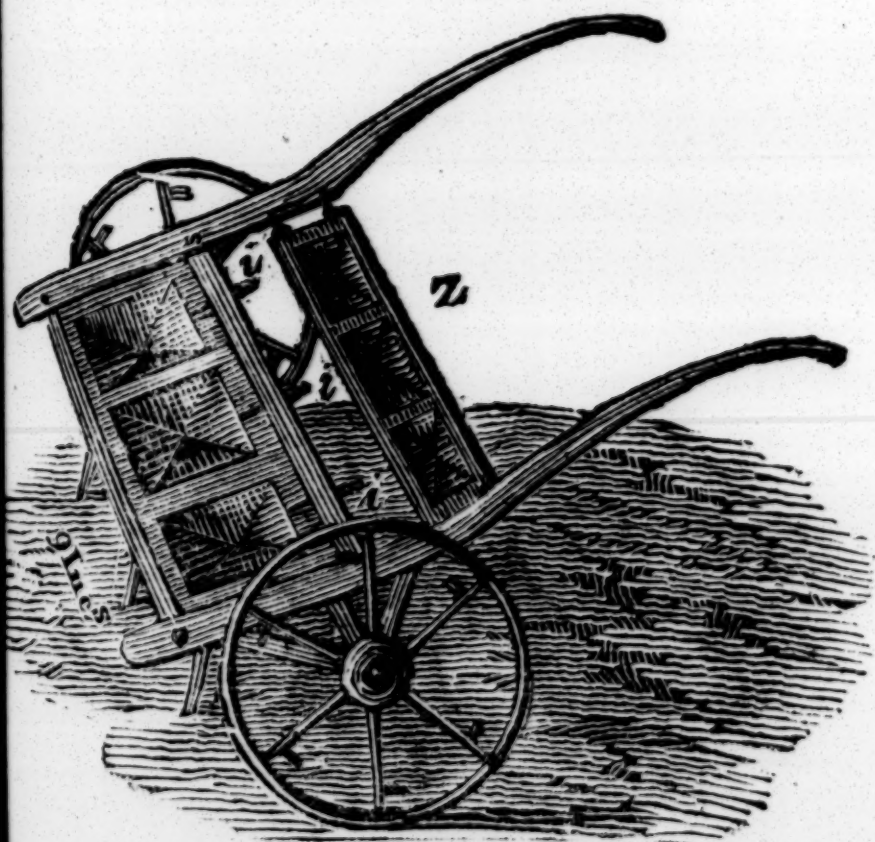
Mr. Lester's cultivator, for which he obtained a silver medal, is similar to Mr. Symes's, but the latter has not wheels at the extremity; the wheel in front I think sufficient, as the flatness of the hoes prevents it from sinking. Four horses must be applied in clay and gravel.

D. Drill for two horses.



I have no drawing of this instrument, that will enable to give it with any degree of accuracy, but it is easily understood; the second and fourth take out, when you require, eighteen inch drills. The irons they are shod with resemble a blunt skait, the middle one about three feet long, the rest something shorter; shod up three or four inches of the wood, with a slight iron wing to the tail of each, on the furrow side only, to clean up the furrow.

E. Barrow sowing machine.

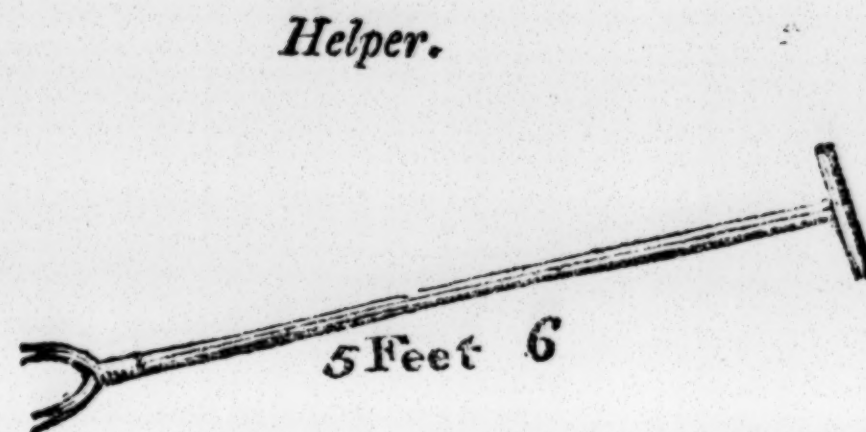
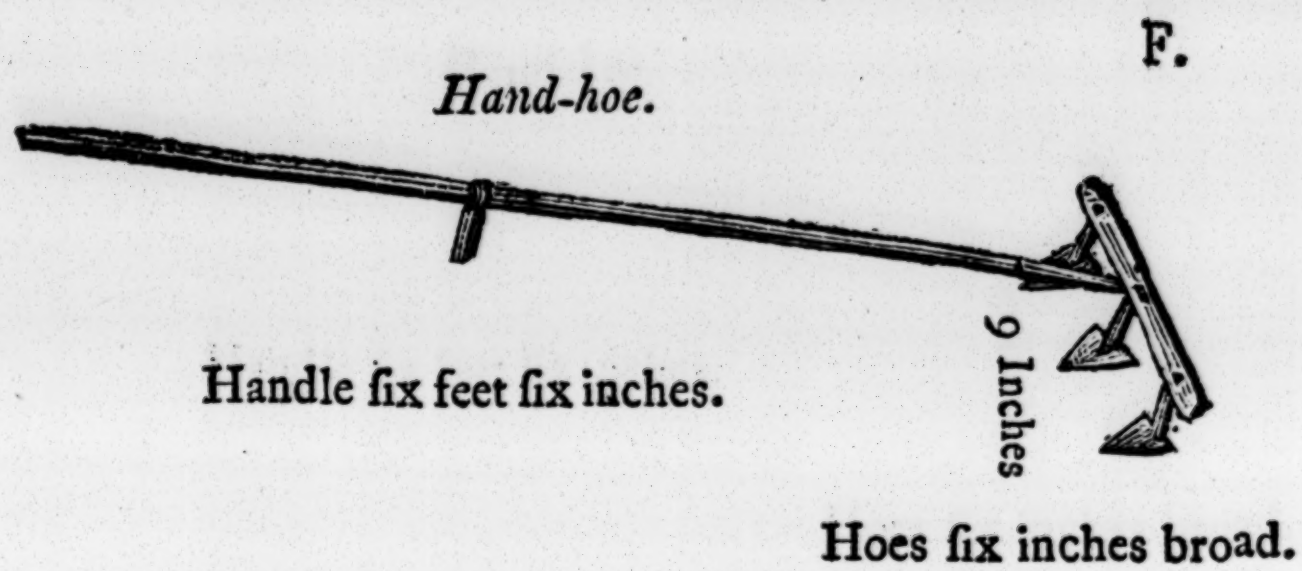


The Barrow sowing machine wheeled by a man; the wheels in the two outward furrows drawn by the drill D.; of course, the tubes of the hoppers come exactly over the three centre drills, as likewise the tubes of the grass feed-box, z, which is occasionally suspended between the handles. I have not received either of these instruments, having as yet used another drill, and fear my drawings are very imperfect.

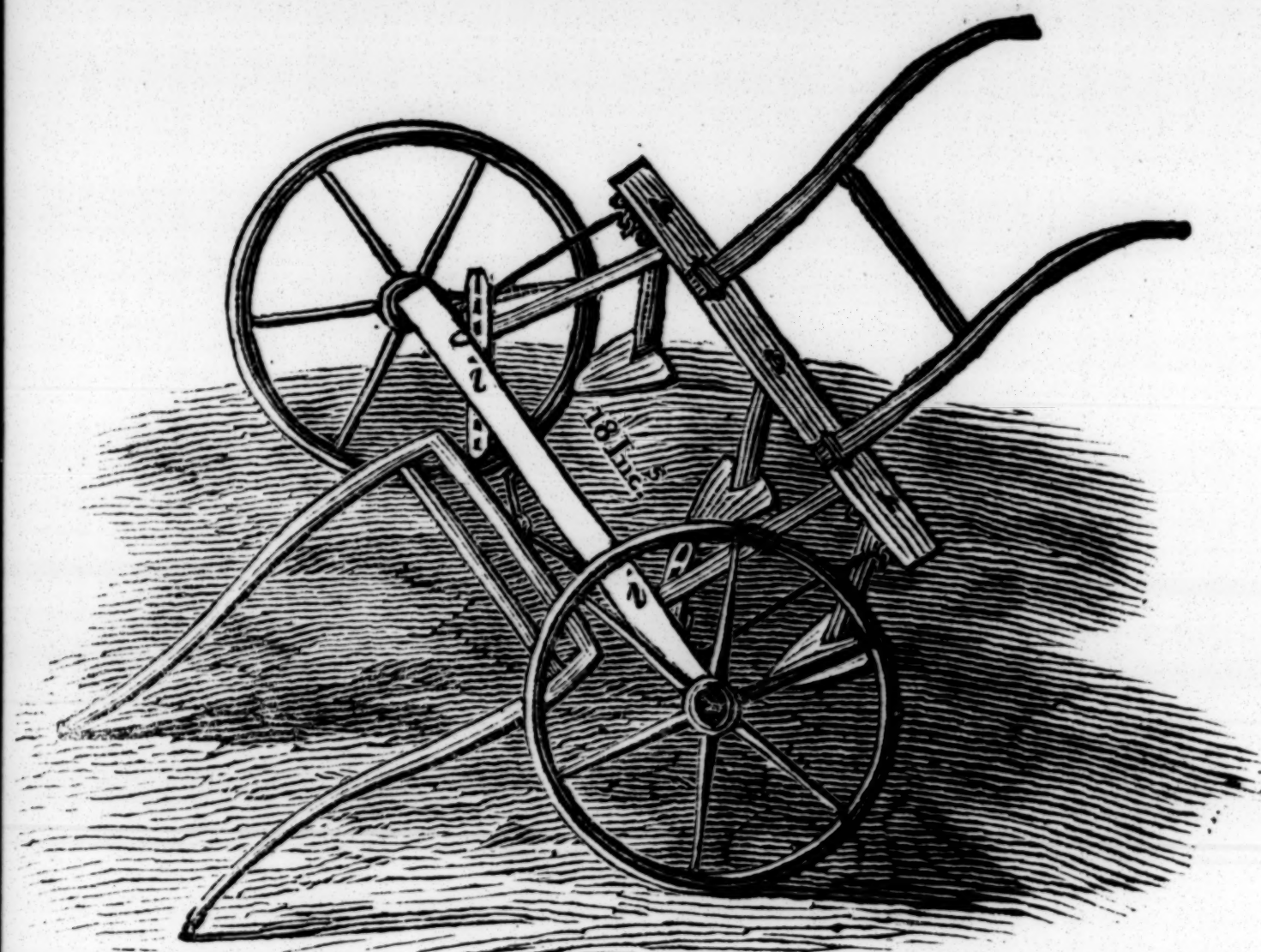
Note, The price of these two compleat is eight guineas at Esler.

z. The grass feed box.

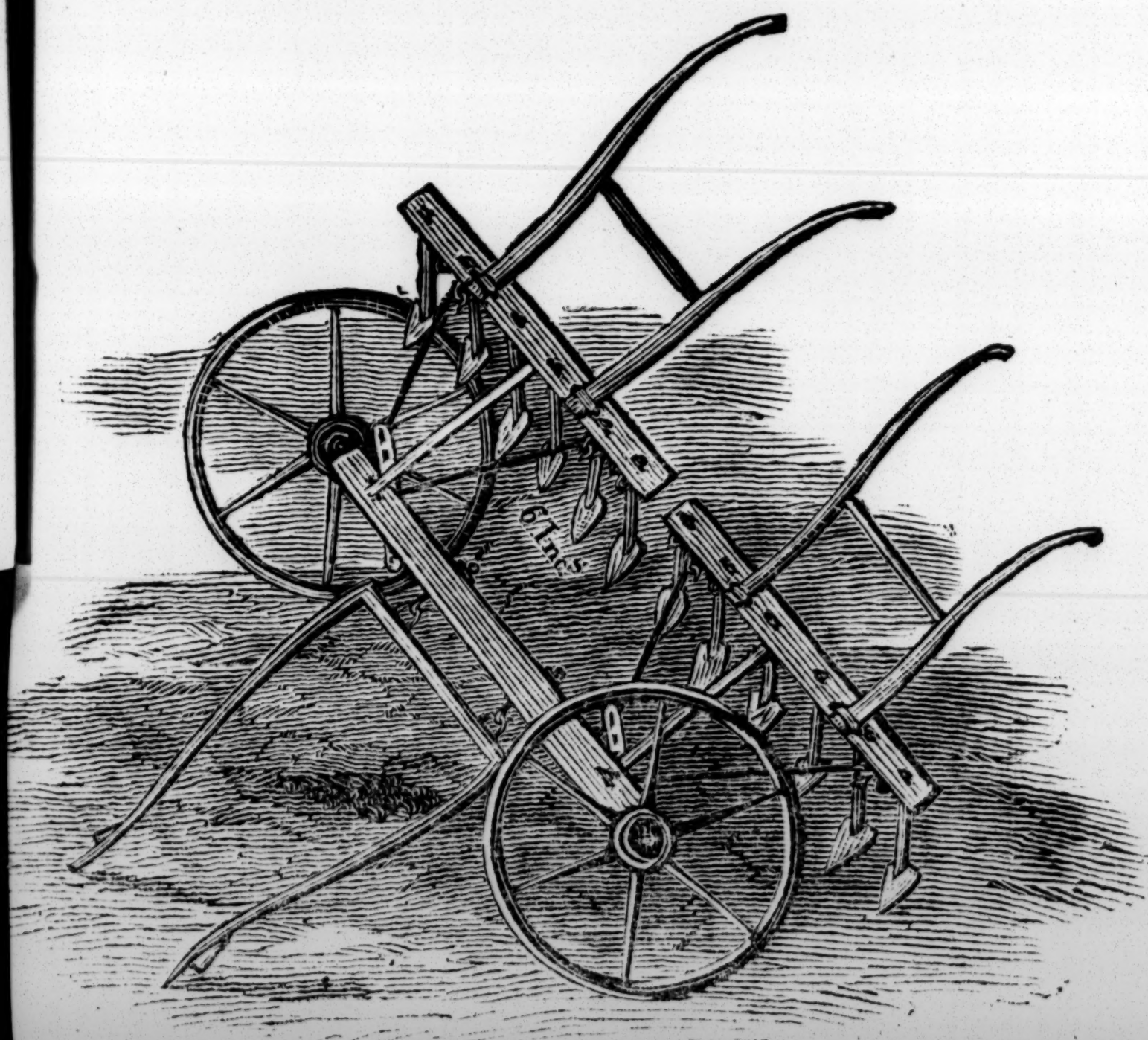
i. i. i. Screws to close the hoppers.



G. *Single Horse-Hoe for Beans, Peas, &c.*



Two-Horse-Hoe for Grain.



The hoes are twelve inches wide, eighteen inches apart from point to point, about eighteen inches deep under the wood, and regulated as to depth by the irons *i, i*; the wheels under four feet high. When necessary to lay peas, vetches, &c. on one side, hay-bands are twisted round the shank of the hoe.

These hoes for grain cover a nine-foot ridge, and work independent of one another; they are fixed to the same shaft and wheels as the single hoe. The hoes are six inches broad, and about sixteen inches under the wood.

AN ESSAY,
ON
DRILL HUSBANDRY,
BY
LT. COL. HARDY,
OF
WESTMEAD, CARMARTHENSHIRE;
GIVING AN ACCOUNT OF THE MODE OF CULTURE,
PRACTISED BY
MR. DUCKET, OF ESHER.

AFTER two years of extreme dearth, the human mind naturally looks back upon the calamities of mankind, and in no wise can it be more properly applied, than on such subjects, as will be most likely to guard against similar recurrences.

It is universally allowed the tillage, throughout the united kingdoms, is very generally defective, and to this cause, in a great measure, may be ascribed the scarcity we had so lately to lament; the present low price of grain, and high price of flesh meat, will naturally lead the farmer back to what he considers most benefi-

B

cial

cial to his own interest, and a great part of the foil, which has been these two years under tillage, will be again appropriated to grafs, I should wish not to say weeds. This will probably have its advantages, and a portion of butcher's meat will again become more generally the food of the manufacturer, or peasant; but could we point out, that, from superior tillage, three fourths of the land so applied would produce as much as the whole, each necessary of life might be obtained on reasonable terms. If we look into the most cultivated spots near the devouring metropolis, where ready market and high prices are powerful incentives; into the eastern countries of Norfolk and Suffolk, where tillage is best understood; and the borders of Scotland, where perhaps as regular practice is pursued: still we must allow, there is scarcely to be found any general good system.

To endeavour to remedy those defects, is the purport of the following sheets, and more especially to apply the observations to a country (Ireland), that from richness of foil, mildness and general humidity of climate, is perhaps naturally more prone to the growth of weeds, which I term every thing not sowed by human hand, than either England or Scotland; this, I conceive, if properly corrected, would render Ireland one of the finest corn countries in Europe;

Europe ; her local situation, and fine harbours, certainly give her an opportunity of transporting it upon as easy terms as any other.

It is admitted Ireland is more inclined to grafs, than either England or Scotland, which may proceed from the causes before mentioned ; but, although lazy farmers and graziers, who from the indulgence of landlords, or local advantages, make easy rents without much application of the plough, and argue, that old ground is the richest for fattening, and dairy, I am much of Lord Kaims's opinion, that all ground should be broke up in rotation, superfluous water carried off, the effects of its acidity corrected, manured, moderately cropped in succession, with such meliorating crops as will tend to destroy weeds ; and then, and not before, stocked with such grasses, as are now pretty generally known to be most beneficial to the brute creation, and which are perhaps as well understood, through the medium of the Dublin Society, in their Botanic Garden, as in most parts of Europe.

His Lordship wisely remarks, there should be no such thing in a well cultivated farm, as what is termed natural meadow, and I say the same of natural pasture, except in situations inaccessible to the plough, or such as are subject to inundations.

I shall not attempt to lead my readers back to the times of the celebrated Tull, Wynne Baker, Anstruther, &c. but endeavour to impress upon their minds what really exists, and particularly upon those, whose avocations have not allowed them an opportunity, or time to pay that close attention I have done.

Mr. Mark Ducket's farm at Elsher has attracted the attention of most of the Royal Family, and induces the first agriculturists to visit his garden-like farm. I shall endeavour, in this little treatise, to point out a mode of drill culture, that gives delight and satisfaction to every reflective mind who beholds it, improves the country, and enriches the individual.

I should premise, that the present occupier of this farm is eldest son of the late Mr. Ducket, whose character, as an improver, was long established, who held this land at will for many years, and who perhaps, from having so slender a hold, and being remote from extraneous manure, may have been induced to begin, and persevere in a system of drill husbandry, which might enable him to continue the plough upon a farm of originally a very poor staple of soil, from whence he could derive more profit than from grass. This man, who died lately, bred his three sons up with such a practical knowledge of his profession, that the late Duke of Bedford made choice of the second,

cond, as his principal land steward, and the third was sent with Sir George Young, as agriculturist, to the Cape of Good Hope. Mr. Mark Ducket, the eldest son, has succeeded his father in his farm, and has lately got a lease, which, I hope, will enable him to put it into a better state, without looking to such immediate profit. The old man was the inventor of his own machinery, and, from a long experience, it appears they are as simple and expeditious as any.

Without further preface, I shall endeavour to give as clear and concise a description of his mode of tillage, implements, and how they are applied, as in my power.

To commence with the first operation (A) ploughing, I must suggest, that without such pains as will cause excellence, all tillage must be but imperfectly executed, and that of drill husbandry had better not be attempted.

Great exactness is attained at Esther, in first striking out the ground perfectly straight, and the whole work is admirably performed. One of Mr. Ducket's principal improvements is what he calls a (B) *skim*, attached to his coulter, just above where the upper part nicks the sod, something the form of a flight wing, but quite sharp at the edge, and steeled in all grass land, or such as is foul with stubble or weeds.

weeds. This skim pares the surface an inch or more deep, turns it over, and, the usual furrow being thrown upon it, so compleatly buries it, that being excluded from air it soon rots, and contributes so much for manure, instead of staring up between the seams, and opposing you in every succeeding operation; this renders unnecessary any second ploughing. I consider it a most capital improvement, and only fear I shall not make myself understood, and confess there is some difficulty in giving it the proper bend, in attaching it to the coulter. These ploughs require rather a higher beam near the coulter mortice, else will answer any swing or Rotherham plough. Mr. Duckett's ploughs do not strike the eye as better, or perhaps as good, as you see with many approved tillers; I think they are heavier than his soil requires; however, the work they perform is superior, and English farmers in general set too little value upon the power they are moved by; however, this is not applicable to him.

Straight lines and exact breadth of furrow, that, at usually six bouts, will leave a ridge exactly nine feet broad, is absolutely necessary, where, from apprehended moisture, ridging is necessary; this ridge contains twelve rows of grain, nine inches apart, and six rows of beans or pease, without loss of furrow, and all his machinery are adapted to those distances. In
dry

dry land laid flat, or what is called broad shots, this excessive exactness of straight lines in ploughing is not so necessary; but why should it ever be dispensed with? It requires a little more attention at first, but soon becomes habitual; straight lines are ploughed with more ease to cattle, less windings, and less loss of time, and it will surely be admitted, that the more exact your breadth, the more likely an equal depth of furrow is to be acquired; of course, a better chance of producing good and equal crops. Sir John Anstruther has, in his Essay on Drill Husbandry, placed this in a very clear point of view. Emulation of all things should be excited among ploughmen, particularly in remote countries; for an operation apparently so simple, and which every man, who walks between the handles of a plough, thinks himself fully adequate to, is in fact the first rudiment in husbandry, which, I am sorry, is little attended to, and seldom brought to perfection.

In land ploughed in autumn or winter for spring crops, pared with a skim, a scuffler (C) is introduced, which, with a pair of horses, cuts the ground about two or three inches deep, by the means of flat hoes sharpened at the edge, and loosens as much in one day, without turning up sod or grass, as six ploughs, covering four feet six inches, and
scuffling

scuffling a ridge at one bout; if the land is weedy, it may be applied with advantage in dry weather some time before sowing; if not, it immediately precedes the drill machine, (D) that with a pair of horses draws the furrows, and, with holder and driver, draws about four acres a day of drills for grain, a fine preparation and working in dry land. The barrow sowing machine (E), simple in its construction and application, deposits the seed, and with such accuracy as if dropped singly by hand. A pair of very slight connected harrows cover it, the horses walking through choice in each furrow, tied by a nine feet rope, the driver behind ready to disentangle each harrow. I need hardly add, that the introduction of this skim, when one or two additional ploughings are rendered unnecessary, will expedite spring work amazingly, especially in the barley sowing season; its application in lay land well ploughed does not prevent drilling, and the succeeding hoeings render these crops as clean and easily harvested, as fallowed land.

Mr. Duckett is not an advocate either for very early sowing, or reducing the quantity of seed as much as other drills; nor can it be an object, to save half a bushel of seed, to lose, perhaps, much more than double; he sows about one third more than other drills, and about the same quantity less than broadcast

broadcast in general; his reason is obvious; his crops being produced from excessive tilth alone, the grain will not tiller and stool, as in ground frequently enriched by manure; his father's stock of cattle, except sheep, has always been comparatively small for his holding, and as he has no other manure than his farm-yard produces, he could but seldom dress his ground. The present man succeeded his father only last Michaelmas; this year I saw with him thirty acres of very promising wheat on light land, that had been but twice manured in twenty-eight years, and constantly under the plough; he informs me his general returns are, thirty to thirty-two Winchester bushels* of wheat, fifty to sixty of barley, and up to one hundred of oats per acre.

As to early sowing, we should be guided by the locality of the spot; what will answer in one farm, may not in the adjoining, but more liberties may be taken in rich ground with less risk.

To enumerate all the advantages arising from the drilling of grain, &c., is beyond the compass of my pen; but I shall endeavour to set forth such as are incontrovertible,
at

* A Winchester Bushel is 56lb. weight. Would it not be most desirable, and a stimulus to cultivate only good grain, if all was sold by weight, and that one general standard was adopted through the united kingdoms?

at the same time pointing out with equal candour such disadvantages as have appeared, from my own experience, or strike me as likely to occur.

By depositing the seed deeper, and covering it an equal depth, you guard against the frequent loss in spring crops occasioned by drought, and partial covering with the harrow; upon a flat surface, particularly in light soils, such grain is apt to be wind-shook, and don't fill; corn by the more regular admission of air in drills ripens fuller and more equally, and from the same cause the quality is always finer, and less small and imperfect seed than in broadcast; I have certainly experienced a less produce, but no comparison between the grain. I am inclined to think, if more seed in general was sowed with the drill, adverting to the strength and preparation of your soil, although half the ground undergoes a compleat fallow for a great part of the year, the drill will exceed the broadcast in quantity. Stronger straw, and more of it, may be expected by the admission of air between the rows, and from the depth of covering it acquires a strength of straw, that enables it to resist the inclemencies of a wet season, or bad harvest, more than broadcast; the straw being coarser and more free from weeds, it is much sooner and safer harvested; and I apprehend strong straw,

straw, that does not lie down, affords more nutriment, when applied to the use of cattle.

It is equally advantageous to the spirited improver, whose luxuriant grain generally suffers most in bad seasons, as to the farmer, who, by frequent cleansing and hoeing, is able to extract a reasonable return from exhausted ground, without manure, otherwise producing half weeds.

Where clovers and grass seeds are sown with drill grain, (an indispensable rotation in all well managed husbandry) it insures a certain growth with less seed; it often happens, that the best season for grain is the worst for the vegetation of grasses; you may wait with patience until the corn is of a considerable height, take advantage of dark or moist time, and sow your grasses between the hand-hoeings; the first is a fine preparation to receive the seed, the next gives it a moderate and equal covering; this mode answers well on winter sowed wheat in spring, even to the month of April, and is perhaps a better companion in rich ground, than either barley or oats, being less likely to lie down; neither does it preclude the use of the horse-hoe after, as Mr. Duckett's sowing drill has tubes behind the hoppers for the grain, to deposit grass-seeds in the same row. I
confess

confess I have not tried grasses in drills, but am induced to think them opposite from grain: grasses cannot be well too thick, except when required for seed; they draw up one another; the quantity is encreased as well as their succulence, which makes them more palatable. The ear of grain is the object, and that can only be ripened by a due admission of air and sun.

Two hand-hoeings (F), and a horse-hoeing, are usually given at Esher to all grain; two boys or women (under two shillings) perform an acre a day, of the hand-hoeing, on winter sowed lands, one boy on spring corn, the second hand-hoeing of course easier; the horse-hoe (G) for grain covers a ridge, and does about fourteen acres a day, at less than a shilling an acre. Exclusive of the total destruction of weeds, how much must the crop be benefited, by the moldings they receive from the hoeings, and which may be increased, if not afraid of inequalities, by deepening the hoes? But how admirably must wheat crops, that have been sowed several months before, be improved by stirring the ground, and breaking the crust of the land with the hoe, admitting thereby mild dews, and the influence of the atmosphere, otherwise excluded? The hand-hoeing upon wheat may take place in March and April; the horse-hoeing in May, and later in spring corn.

corn. I met Mr. Wilkinfon, and some good improvers from the north of England, when this operation was performing, and when Mr. Duckett's wheat was from eighteen inches to two feet high; we were all astonished, that three men and two horses did not the least injury to the crop, that throd upon, even by the horses, rose immediately; but for their own ease, they soon learn to prefer the interval.

The extirpating of weeds is of the first consequence, and ought alone to be sufficient to give the preference to the drill, by substituting corn instead of weeds; its advantages, when fully considered, are more than two-fold; by preventing weeds from stocking your ground, (or perhaps feeding) pure and beneficial grasses only arise, and where roots or pulse are used as meliorating crops, the expence of banishing weeds is incalculable in foul ground.

Among the objections to this system, the expence of furnishing the implements is among the least, as there is still a considerable annual saving in seed, to reimburse you the first cost. I am well aware it must be first begun by liberal men; but there is more required; it must be in a great measure by their own personal attention, that at first the difficulties attending all innovations must
be

be done away. If skilful persons are not either sent with those implements, or sent to obtain a knowledge of them before application, numerous difficulties will arise. Mr. Duckett however assures me, he seldom employs the same people the second year, at the same instrument, and though not early conversant myself, nor now by any means skilful in the practical part of husbandry, I found no difficulty in performing work with his machinery, with my own hands, except his drill, which opens the furrows, and requires a little use to draw in direct lines, and which any expert ploughman will learn in a day. A great deal of the perfection of the future operations depends upon the exactness of your lines. If your rows of grain, &c. are not in straight lines, you must either leave weeds, or cut up grain in hoeing; this in my opinion gives Duckett's drill such a decided superiority; as, in 290 drilled acres I frequently went over, I could not perceive one crooked line. Exclusive of the expense and difficulty of providing, keeping in order, and putting into practice, a set of machinery, which, if once adopted, must be complete in all its parts, I should fear (of which I confess I have no experience) that in drilling heavy land in wet autumns for wheat, or very rarely for beans in spring, (though

(though neither seed is easily perished,) that from the weight of the instrument, and length of the irons, that draw the drills, and which is necessary to direct it straight, water might lodge in the furrows, and destroy the grain; it don't appear to be the case in any part of Duckett's crop, which I viewed with great attention; but he has no ground sufficiently tenacious, to put this to the proof. I must here caution those, who make short visits to this place, of an erroneous opinion, that is too generally formed about the quality of his soil, that it is of so light a nature, and so easily worked, that such implements, as will answer there, will not in one farm in a thousand; certainly that part of it, that lies immediately about the town, and which I understand goes to the second brother, is, for the most part, a deep, tender land; but the principal tillage ground, which is beyond his house and the river, is critical sand to plough, being inclined to clay upon a sand, and difficult to subdue after spring drought, when not attended to in time; it is free from stones, and so should all ground where drill culture is introduced, at least from large ones; were it not for the constant pulverizing it receives from its frequent hoeings, it would be tougher land to work, than most in the country, The objection made by theorists,
or

or implement makers, who have little knowledge of the practice, that Duckett's drill must be imperfect, until it can by the same operation and machine drill and sow, is to me absurd: nothing is more simple, than to attach the barrow to the drill, and its additional weight of draught cannot be felt; they are kept purposely apart for the following reasons: any defect can be remedied in drawing his lines to receive the seed, which could not, if the seed was dropped at the same time; he can throw up his land to receive more drought in a wet season, or, in a dry one, wait until dew or moisture is collected in the furrows: a man, who sows four acres a day, at the rate of 6d an acre, and whose whole attention is applied to his hoppers and machine, does not leave a single yard imperfect. Beans, pease, &c. are dropped by the same barrow, in single rows of eighteen inches, with an accuracy that is astonishing, as are vetches, &c., which are easily kept clean by a single horse-hoe, that will get over six or seven acres a day, which prove from their great shade powerful ameliorators. With winter vetches, he sows more than a peck of wheat, or less of rye to the acre. With spring tares tartarian oats, whose strength of straw keeps them off the ground in wet seasons from rotting. In early

ly situations you may get them off in time for turnips and cabbage.

Ducket's management of potatoes is superior; being possessed of very early kinds, he does not plant extravagantly soon; his earliest in rows, between early beans, which preserve them in some degree from frost and wind; in common he plants them, much budded, in three-feet rows, when fit to mold, in April or May; sets his late kinds in the intervals; and, as the first return are dug in June, the late ones are nearly molded by the same operation: he re-sets the early stalks, which produces his seed for the ensuing year; thus having three crops in the same season, where, in general, only one is produced. I cannot approve of planting the degenerate offspring of a second growth; as all seed, in my opinion, should be the purest, best, and most ripened. His local advantages, no doubt, are great; he frequently sells his early produce in Covent Garden, by the cart or waggon load, at 1*d.* a pound, and they are retailed at more than double. An acre has produced him above 100*l.*, which will not surprise my Irish readers, who are acquainted with the early produce of this valuable root, in the rich moors in the county of Wicklow.

Turnips he does not drill, as he feeds them off with ewes and lambs, which prevents his
c using

or implement makers, who have little knowledge of the practice, that Duckett's drill must be imperfect, until it can by the same operation and machine drill and sow, is to me absurd: nothing is more simple, than to attach the barrow to the drill, and its additional weight of draught cannot be felt; they are kept purposely apart for the following reasons: any defect can be remedied in drawing his lines to receive the seed, which could not, if the seed was dropped at the same time; he can throw up his land to receive more drought in a wet season, or, in a dry one, wait until dew or moisture is collected in the furrows: a man, who sows four acres a day, at the rate of 6d an acre, and whose whole attention is applied to his hoppers and machine, does not leave a single yard imperfect. Beans, pease, &c. are dropped by the same barrow, in single rows of eighteen inches, with an accuracy that is astonishing, as are vetches, &c., which are easily kept clean by a single horse-hoe, that will get over six or seven acres a day, which prove from their great shade powerful ameliorators. With winter vetches, he sows more than a peck of wheat, or less of rye to the acre. With spring tares tartarian oats, whose strength of straw keeps them off the ground in wet seasons from rotting. In early

ly situations you may get them off in time for turnips and cabbage.

Ducket's management of potatoes is superior; being possessed of very early kinds, he does not plant extravagantly soon; his earliest in rows, between early beans, which preserve them in some degree from frost and wind; in common he plants them, much budded, in three-feet rows, when fit to mold, in April or May; sets his late kinds in the intervals; and, as the first return are dug in June, the late ones are nearly molded by the same operation: he re-sets the early stalks, which produces his seed for the ensuing year; thus having three crops in the same season, where, in general, only one is produced. I cannot approve of planting the degenerate offspring of a second growth; as all seed, in my opinion, should be the purest, best, and most ripened. His local advantages, no doubt, are great; he frequently sells his early produce in Covent Garden, by the cart or waggon load, at 1*d.* a pound, and they are retailed at more than double. An acre has produced him above 100*l.*, which will not surprise my Irish readers, who are acquainted with the early produce of this valuable root, in the rich moors in the county of Wicklow.

Turnips he does not drill, as he feeds them off with ewes and lambs, which prevents his
c using

using the Northumberland drill, that leaves the ground in ridges. I see no objection to drilling flat on his dry land, as the hoeing is more perfectly performed at one quarter the expence, and his manure would go much further.

For carrots he uses a single hoe, that runs about fourteen or sixteen inches deep after, and in the furrow of a deep ploughing, without turning any soil over. This is a fine preparation for roots, and new to me, but will answer only in tender and deep soils.

His rotation of crops I cannot say is by any means established; I can only give you what has been his father's practice, scarcely yet his own.

Turnips dunged,	Turnips <i>dunged</i> or <i>not</i> ,
Barley,	<i>Barley</i> or <i>oats</i> ,
Clover and ray-grass,	Beans, peas, or vetches,
Wheat,	Wheat,
Winter tares or beans,	Clover and rye-grass,
And turnips again.	Wheat,
	And turnips.

The objection, that may arise in mens' minds to the adoption of a system so complete, will probably be the apprehension of not finding people to perform the different works, particularly in remote countries, who have little idea of it; this I confess a strong one. It occurs

occurs to me, by sending agricultural apprentices to Mr. Duckett, or any other skilful farmer for two years, who should be regularly bred to the practice, and work like common labourers, and who would, by his instruction, become perfectly acquainted with both theory and practice, that no difficulty would arise, wherever they went, in diffusing their knowledge. Whether those pupils were sent by agricultural societies or individuals, they may still be the property of those, who are inclined to enter into the expence, and may be bound, for a limited number of years, like any other indented apprentice, to recompense the adventurer by their knowledge. I have conversed with Mr. Duckett on this subject, who has no objection to receive a limited number, if the terms are made worth his acceptance. The Rev. Mr. Close, of Hordle, in Hampshire, had this in contemplation, under the care of his Suffolk bailiff; but I have lately heard from him, that he has relinquished the idea, which, from his own knowledge and experience, I cannot but consider a public loss. Every man may purchase implements in Margaret-street, but most of those, who dispose of them, are ignorant of their application, and few of them understand their common principles. I cannot here refrain from offering the example of the Dublin Society to the Board of Agriculture, and Bath

Society, of having, like the former, a repository for all kinds of implements of husbandry, which should be open to *every one* to copy, or take models from. M'Dougal, of Oxford-street, who styles himself Implement-maker to the Board of Agriculture, and who really possesses more knowledge than half the men in his line in London, seldom has any thing made by him but what is bespoke, and soon carried off, and really has not room to exhibit any thing of the sort. The rent of a ware-room, and models of every new and improved instrument, would be attended with little expence, and great advantage might be derived from it.

I have endeavoured to give my observations on the practice pursued by mere farmers, who have lived by the sweat of their brow; the result of several visits this year and the former; not for a few hours, but days, in which the proprietor evinced great liberality, not particularly to me alone, in bestowing a considerable portion of his time to make his visitors acquainted with his system. In offering that system to the public, I do not presume to advise the wild speculations of a theorist, or the whimsical and expensive fancies of men of fortune, who sacrifice considerably to this laudable ambition. Mr. Duckett's farm is seen daily; it is improved,

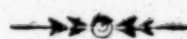
proved, and improving; so I hope are his means, having little else to depend upon. This is the man I have made choice of as an example; and, in holding forth his practice, I trust I have not made an injudicious one.

WESTMEAD, AUG. 12, 1802.

Laugharne, South Wales.

EXTRACTS

EXTRACTS
FROM
VARIOUS AUTHORS,
RECOMMENDING
THE DRILL HUSBANDRY.



NOTWITHSTANDING the decided superiority of the drill husbandry, in many kinds of grain, pulse, and grasses, many farmers are still enemies to it; and a still greater number are too indolent to go one step out of the old beaten path, though the advantages they might reap are obvious.

This was the case many years in this county, with respect to hoeing of turnips; but those prejudices are now generally overcome, and we have very few, if any, farmers stupid or obstinate enough to sow turnips, without having them twice well hoed.

Some reasons, indeed, may be urged in favour of a few persons not adopting the drill husbandry, because the warmest advocates for it must allow, that there are soils and situations

ations, wherein the broadcast method is preferable, at least in many cases. But these instances are but few, and ought not, by any means, to check it in general.

Drill husbandry is, as a good writer has justly defined it, "*the practice of a garden brought into the field.*" Every man of the least reflection must be sensible, that the practice of the garden is much *better* than that of the field, only a little more expensive; but if (as is the case) this extra expence be generally much more than repaid by the superior goodness and value of drilled crops, it ought to have no weight in comparing the two modes of husbandry.

In the broadcast method the land is often sown in bad tilth, and always scattered at random, sometimes by very unskilful hands.

In drilling, the land must be in fine order; the seed is set in trenches, drawn regularly, all of nearly an equal depth, and that depth suited to the nature of each kind of seed.

These seeds are also distributed at proper distances, and, by being equally and speedily covered, are protected from vermin and other injuries; so that the practice of the garden is here exactly introduced into the field.

In the broadcast method, the seed falls in some places too thick, in others too thin; and, being imperfectly covered, a part of it is devoured

voured by vermin, which follow the sower; another part is left exposed to rain or frost, or to heats, which greatly injure it. When harrowed in, a great part of it (small seeds especially) is buried so deep, that, if the soil be wet, it perishes before it can vegetate.

Again; when thus sown, there is no meddling with the crop afterwards, because its growth is irregular. The soil cannot be broken to give it more nourishment, nor can even the weeds be destroyed without much inconvenience and injury.

But, in the drill husbandry, the intervals between the rows, whether double or single, may be horse-hoed, and thereby nourishment may repeatedly be given to the plants, and the weeds almost totally destroyed.

The very same effects, which digging has upon young shrubs and trees in a garden, will result from horse-hoeing in a field, whether the crop be corn or pulse; for the reason of the thing is the same in both cases, and, being founded in nature and fact, cannot ever fail. In drilling, no more plants are raised on the soil than it can well support; and, by dividing and breaking the ground, they have the full advantage of all its fertility.

The plough prepares the land for a crop, but goes no further; for in the broadcast husbandry it cannot be used; but the crop receives

ceives greater benefit from the tillage of the land by the horse-hoe, while it is growing, than it could in the preparation. No care in tilling the land, previous to sowing, can prevent weeds rising with the crop; and, if these weeds be not destroyed while the crop is growing, they will greatly injure it. In the broadcast husbandry this cannot be done; but in drilling the horse-hoe will effect it easily. And what adds to the farmer's misfortune is, that the most pernicious weeds have seeds winged with down, which are carried by the wind to great distances, such as thistles, sowthistles, coltsfoot, and some others.

If the expence of horse hoeing be objected, there are two answers, which may very properly be made. The first is, that this expence is much less than that of hand-hoeing, were it practicable, or of hand-weeding. The second is, that it is more than repaid by the quantity of seed saved by drilling, to say nothing of the extra quantity and goodness of the crops, which are generally self-evident.

From these considerations, founded on, and justly drawn from established facts, the comparative advantage is so great in favour of the drill husbandry, that it must be strikingly visible to every unprejudiced person.

Bath Papers, v. 2. p. 204.

MR.

MR. RANDALL says, "It is an experimented fact, that, on a fine loam, exquisitely prepared, one hundred and forty bushels have been produced from one acre. And, I believe, it is not known what the increase may be brought to in rich lands, by high cultivation.

Some years since, I had beans dropped alternately with potatoes, at two feet distance in the rows, which were three feet apart, and ploughed in the intervals. The land adjoining was sown with beans and peas, which were a good crop; but those sown among the potatoes a better one. I pulled one stem of the beans planted with the potatoes, which had three branches rising from the bottom, and it produced two hundred and twenty-five beans. In all the trials of drilled beans, most of the stems had two branches, with many pods upon each.—From these and other instances, I believe it is not yet known, to what increase grain may be brought by drilling, good cultivation, and manure.

Horse-hoeing is certainly preferable to close drilling or hand-hoeing, but the latter is superior to broadcast.

Horse-hoeing the full depth increases the crop, by making it tiller or branch more than it otherwise would do; and the advantage is distinctly observable every hoeing, by the colour of the grain. It prepares the ground for
the

the next crop, at the same time that it increases the crop growing, which hand-hoeing does not, although it may destroy the weeds.

Thus drilled ground is kept in a loose open state to receive the benefit of the influence of the air and weather, which broadcast has not; and it is evident, from certain experience, that crops may be drilled many years, to good advantage, without manure.

Suppose the crops only twenty bushels per acre, what course of broadcast crops will give 5*l.* an acre for the course?

But suppose they are dunged the same as any ground in the most approved course, there is the greatest reason to expect as much as in the above experiment, which is twenty-eight and three quarters, and, at five shillings per bushel, amounts to 7*l.* 3*s.* 9*d.*

Mr. Tull directs four hoeings, and Mr. Forbes five.

First. In November, when the plant has four blades.

Secondly. In March, deep, and nearer the rows than the former. Both these hoeings should be from the rows.

Thirdly. Hand-hoed when it begins to spindle, if the earth be crumbly, *to* the rows.

Fourthly. When it begins to blossom, *from* the rows, but as near to them as in the second hoeing.

Fifthly.

Fifthly. When done blossoming, to ripen and fill the grain, to the rows.

Bath Papers, v. 2. p. 284.

Sir J. ANSTRUTHER.

IN ———, 1785, 3 A. 2 R. 20 P. of English measure were drilled with some Lincolnshire barley. Part of this was one acre, upon which the experiment of transplanted wheat, and dibbled wheat and barley, was made last year. The remainder was after carrots and cabbages; and as it was not manured for these, it had a top-dressing of dung. Upon that were drilled $4\frac{1}{2}$ bushels of Winchester measure; these were drilled after the plough, by a man following the plough, and dropping the seed by hand; a second plough followed and covered this; and the third furrow was sown and covered in the same manner: by this plan the rows were at eighteen inches distance; these were hand-hoed once, at the expence of 10s. The produce was 147 bushels, which is nearly 32 for one, and is $40\frac{1}{2}$ bushels per English acre.

The rest of the field was sown broadcast at the same time, with the same grain; the same quantity of this was measured, viz. 3 A. 2 R. 20 P.; and the proportion of seed to this measure

measure was $16\frac{1}{2}$ bushels, or about $4\frac{1}{2}$ per acre. This was after turnips, for which the land was previously manured. The produce was 114 bushels, which is nearly 7 after 1, and $31\frac{1}{4}$ bushels per English acre.

Produce of the drilled	} Bushels.	Broadcast produce $31\frac{1}{2}$	} Bushels.
per acre - - $40\frac{1}{2}$		Deduct the seed - $4\frac{1}{4}$	
Deduct the seed - $1\frac{1}{4}$		Clear produce - $27\frac{1}{4}$	
Clear produce - $39\frac{1}{4}$			

Produce of the drilled superior, 12 bushels.

Bath Papers, v. 4. p. 266.

Sir J. ANSTRUTHER.

DRILL ROLLER.

LORD ORFORD has this year put in many acres of barley, pease, &c. with a machine not long invented in Norfolk, which has done much work so well, that many have been made, and are highly approved. It is a roller about seven feet long, around which are cutting wheels, of cast iron, that turn each, independently of the others, around one common cylinder,

cylinder, weighing about a ton; it is drawn by four horses; the cutting wheels, being moveable, may be fixed at any distance, by means of washers; but the most common and favourite distance is four inches. The mode of working it is this:—A layer being ploughed, which the owner intends for setting or dibbling, this roller is used to save the expence. It is drawn across the furrows, and cuts the whole field into little drills, four inches asunder; the seed is then sown broadcast, in the common quantity, and the land bush-harrowed; by which means the seed is deposited at one equal depth, as in drilling, that depth a better one than in setting, and the crop rises free from the furrow-seams, which are the ill effects of common broadcast sowing on a lea, ploughed once. Lord Orford's crops, sown with this roller, I viewed with great pleasure; they are perfectly regular, and of a beautiful appearance. This machine promises to banish dibbling.

Young's Annals, v. 12. p. 45.

UPON a very excellent, light, dry loam, in good heart, after a thin crop of lea wheat (being much injured by the worm), gave one ploughing,

ploughing, and sowed as under, in November 1789, viz.

- No. 1. One acre drilled with the Rev. Mr. Cook's machine, 2 bushels.
2. One acre ditto, 2 bushels.
3. One acre ditto, $1\frac{1}{4}$ bushel.

And three acres sown broadcast, $6\frac{1}{2}$ bushels equally distributed. A succession of wet weather leaving the land, previous to sowing, extremely poachy, rendered working the drill difficult; and, indeed, in the whole sowing, we literally followed the old advice, "to sow wheat in the mud." The winter proving uncommonly mild, the wheat grew rank; accordingly, in March, it was fed down close with sheep and lambs; the weather continuing dry and temperate, the two acres, No. 1, and 3, were horse-hoed; the acre, No. 2, left purposely, as was intended, one acre of the broadcast for competition; but, from inattention, the three acres were hand-hoed. The whole field underwent the like hoeings early in May; the wheat, which had been horse-hoed, soon appeared in colour and strength superior to the other acre, and far outstript the broadcast: this might probably be attributed to the horse-hoes striking the soil deeper and more effectually than the hand-hoe; particular care was
taken

taken in harvesting, and laying separate in the barn. The cost of Mr. Cooke's drill-machine and horse-hoes is about thirteen guineas (repairs, it has wanted none in three years use); and being competent to say, that, in such land as mine, sowing eight acres is a fair day's work for man, boy, and horse; I presume that 1s. per acre is an ample charge for the work, to include "capital enlarged, labour multiplied, and team encreased;" as rather more land may be gone over with the horse-hoes, 9d. per acre will be fully adequate.

The expences on the broadcast are set at the usual rate in this part of the country.

No. 1. *One Acre drilled.*

EXPENCES.						PRODUCE.			
	£.	s.	d.	Q.	B. P. G.		£.	s.	d.
Two bushels of seed,				3	0 2 1	of wheat,			
at 7s. 6d. - -	0	15	0			at 7s. -	8	12	5
Drilling - - -	0	1	0						
Twice horse-									
hoeing - - -	0	1	6						
Threshing, at 3s.									
per quarter - -	0	9	4						
Net produce - -	7	5	7						
	<u>£. 8 12 5</u>								

No. 2. *One Acre drilled.*

EXPENCES.

PRODUCE.

	£.	s.	d.	Q.	B.	P.	G.	£.	s.	d.
Two bushels of feed,				2	7	0	1,	at 7s.	8	1 11
at 7s. 6d. per										
bushel - - -	0	15	0							
Drilling - - -	0	1	0							
Threshing - -	0	8	9							
Net produce -	6	17	2							
	£.8	1	11							

No. 3. *One Acre drilled.*

EXPENCES.

PRODUCE.

	£.	s.	d.	Q.	B.	P.	G.	£.	s.	d.
One bushel, 1 peck				3	1	1	1,	at 7s.	8	17 8
of feed - - -	0	9	5							
Drilling - - -	0	1	0							
Twice horse-										
hoeing - - -	0	1	6							
Threshing - -	0	9	6							
Net produce -	7	16	3							
	£.8	17	8							

Three Acres Broad-cast.

EXPENCES.						PRODUCE.		
	£.	s.	d.	Q.	B. P. G.	£.	s.	d.
Six bushels, 2 pecks of feed, at 7s. 6d.				8	2 3 0	of wheat, at 7s.	23	7 3
per bushel - -	2	8	9					
Sowing, at 3d. per acre - - -	0	0	9					
First hand-hoeing	0	15	0					
Second ditto - -	0	10	6					
Threshing, at 3s. per quarter -	1	5	0					
Net produce -	18	7	3					
	<u>£.23 7 3</u>							

Comparative Statement of Net Produce.

DRILLED.				BROAD-CAST.			
	£.	s.	d.		£.	s.	d.
No. 1. One acre horse-hoed	7	5	7	Three acres hand- hoed - -	18	7	3
2. One acre not horse-hoed	6	17	2	Difference in fa- vour of drill	3	11	9
3. One acre horse-hoed	7	16	3	Or per acre 1l. 3s. 11d.			
	<u>£.21 19 9</u>				<u>£.21 19 0</u>		

The

The experience of two harvests warrants me to speak favourably of the drill system: I cannot but conceive, that, under proper attention and management, it will be found productive, especially on soils similar to, or lighter than mine. The little farm I occupy (only 100 acres) contains no land stronger than what is ploughed with two horses with pleasure, except to break up old ground in a dry season: at the same time I am free to declare, I know no reason why it should not succeed on heavy lands, provided they can be brought into tilth for the coulters to work. Here may be some impediment to scarifying, or horse-hoeing, it is true, but not the hand-hoe, which, although most certainly not so effectual as the former for loosening the soil, and, consequently, permitting the fibres to shoot more freely; yet, in the hands of husbandmen used to the work (and the best of them carefully looked after), I believe it will not be disputed that the weeds may be destroyed better. But it is with deference I submit, whether the primary object, attained in drilling, is not the free circulation of air, and influence of the sun? That position admitted, the horse-hoeing becoming a secondary consideration, I infer, that drilling, if advantageous on one soil, will be found, in some degree, so on a different one. That this may not appear entirely speculative, I beg to refer

to the first experiment on wheat, where one acre, not horse-hoed, yielded a net produce of 6l. 17s. 2d.—the three acres broad-cast, hand-hoed, 18l. 7s. 3d. or, per acre, 6l. 2s. 5d., leaving a balance in favour of the drilled, 14s. 9d.; notwithstanding, I beg leave to be clearly understood as a strenuous advocate for the horse-hoe, or scarificator, where the tenacity of the soil does not render their use impracticable.

Young's Annals, v. 18. p. 130.

E. TRELAWNY, ESQ. Essex.

FROM
MR. AMOS'S WORK
ENTITLED,
THE THEORY AND PRACTICE
OF
DRILL HUSBANDRY.

On drilling Wheat.

THE first thing to be considered is the quality of the soil, in order to ascertain the quantity of seed to be sown upon an acre. If the soil is poor, the distance between the rows should not exceed eight inches, and the quantity of seed, sown upon an acre, should be about nine pecks, at two inches and a half deep. If the soil is of a middling quality, the distance between the rows should not exceed nine inches, and the quantity of seed eight pecks. If the soil is rich, the distance between the rows should not exceed ten inches, and the quantity of seed seven pecks, which should be pickled, limed, and dried completely.

On drilling Barley.

From what has been said on drilling wheat, little more need be said on drilling barley,
as

as the quantity of seed and distance between the rows are nearly equal, on soils of equal quality.

But as barley has not to withstand the severities of winter, the depth, at which the seed should be deposited, may be rather less.

And as the roots of barley are more tender and fibrous than those of wheat, they therefore require a finer tilth. But the depth and distance, at which grain should be planted, depend so much on the season, and on the condition and culture of the soil, that every occupier of land must therefore experiment for himself.

On drilling Oats.

The roots of oats being strong and piercing, they are therefore generally sown upon land unfit for either wheat or barley ; and as they do not *tillure* so much, a greater quantity of seed is therefore necessary to be sown upon an acre.

When the distance between the rows is eight inches, the machine will sow fourteen pecks ; at nine inches, twelve pecks ; and at ten inches, ten pecks.

On drilling Beans and Pease.

Beans and pease being very succulent plants, they therefore require a greater distance between
tween

tween the rows, especially as they are peculiarly adapted to the horse-hoeing culture. And the best distance I have always found to be about twenty-four inches. At this distance, the machine can drill three rows at once; and with two feed wheels in every one of the feed troughs, that are employed, eight pecks of feed will be sown. Beans having a very strong tap root, the feed therefore requires to be deposited at a pretty good depth; and my experiments shew, that about three inches is the best depth.

On drilling Turnips and Rape.

Having prepared the seed as directed before, nothing more is necessary to be done, but to reverse the feed wheels, and fix the coulters at the distance, at which you intend the rows to be asunder.

On poor soils I have always found, that ten inches is the best distance, and on rich ones twelve, and about one inch the best depth. When turnips are sown at a greater distance, they grow too large for keeping long. On very rich soils, a greater distance may be adviseable, but then they should be eaten off before Christmas. It is an experimented fact, that the smaller the turnip, the longer it will resist the winter's frost.

On

On drilling Carrots.

For every acre to be drilled, take two pounds of carrot seed (which has been steeped in rain water for twenty-four hours, and which has lain upon a floor, until it has spear-ed), three pecks of dry saw-duft, and three pecks of fine dry mould, all thoroughly mixed together; and drill it about one inch deep, and fourteen inches between the rows, with the same cups, which are used for wheat or barley. In about eight or ten days, the plants will begin to appear; and the sooner they come up, the sooner they will get above the weeds. After drilling, the land should be harrowed once in a place.

A TABLE,

A TABLE,

Shewing the quantity of seed most proper to be drilled upon an acre of land, of various qualities, and the best distance between the rows, so as to produce the largest crops possible.

Kind of soil.	Wheat.		Barley.		Oats.		Beans.	
	Quantity of seed.	Distance between the rows.	Quantity of seed.	Distance between the rows.	Quantity of seed.	Distance between the rows.	Quantity of seed.	Distance between the rows.
	Pecks	Inches	Pecks	Inches	Pecks	Inches	Pecks	Inches
Poorest.	10	8	12	8	16	8	12	18
Poor.	9	8	10	8	14	8	10	20
Rich.	8	9	8	9	12	9	9	24
Richest.	7	10	7	10	10	10	8	28

I am truly sensible that no certain standard can be fixed for the quantity of grain, which ought to be sown upon an acre of land; this must differ, as the circumstances differ that attend it. The soil, season, climate, state of the land, and the size of the grain, require more or less, as these are different.

According as these circumstances obtain, intermediate quantities of seed may be sown per acre, on land of intermediate qualities.

The reputation of the drill system has suffered materially from its own advocates, recommending too small a quantity of seed to be sown upon an acre.

When

When too small a quantity of seed is sown, upon the richest soils, the crop keeps *tilluring*, till it is time to cut it down. In which case there is always a great number of small ears and light grain, which greatly reduces the value of the crop.

On hoeing.

Hoeing is the breaking, dividing, or pulverizing the soil between the rows of corn, that have been drilled, or between plants, that have been set in rows, with intervals between them; and is one of the most important operations in the drill husbandry.

The advantages, arising from hoeing, are great and numerous. By it, weeds are destroyed; the pasture of plants increased; the fertility of the soil greatly restored; vegetation promoted; and the land half prepared for a succeeding crop.

Rain, snow, hail, dew, &c. are easily absorbed by the earth, when it is kept in a loose, light, pulverized state; whereas the same principles on a compact hard soil reach no farther than the surface, and are again exhaled by the sun and wind, with little or no benefit to the soil they fall on.

Pulverizing the land is wonderfully efficacious on stiff or loamy soils; but on light, sandy,

sandy, and thin ones, too much ploughing and hoeing will prove hurtful.

In all operations of hoeing, the land should neither be too dry nor too moist, but in a due medium with respect to both.

Light dry soils may be hoed almost any time, but stiff moist soils cannot be hoed but at particular seasons; and that is when the soil is in a crumbly mellow state.

Grain or small seeds, when drilled with narrow intervals, must be hoed with small shares proportioned to the distance between the rows. But pulse and other plants, that are drilled, or set at a greater distance, require larger and stronger instruments.

DESCRIPTION

DESCRIPTION
OF AN
INSTRUMENT
FOR
LEVELLING GROUND,

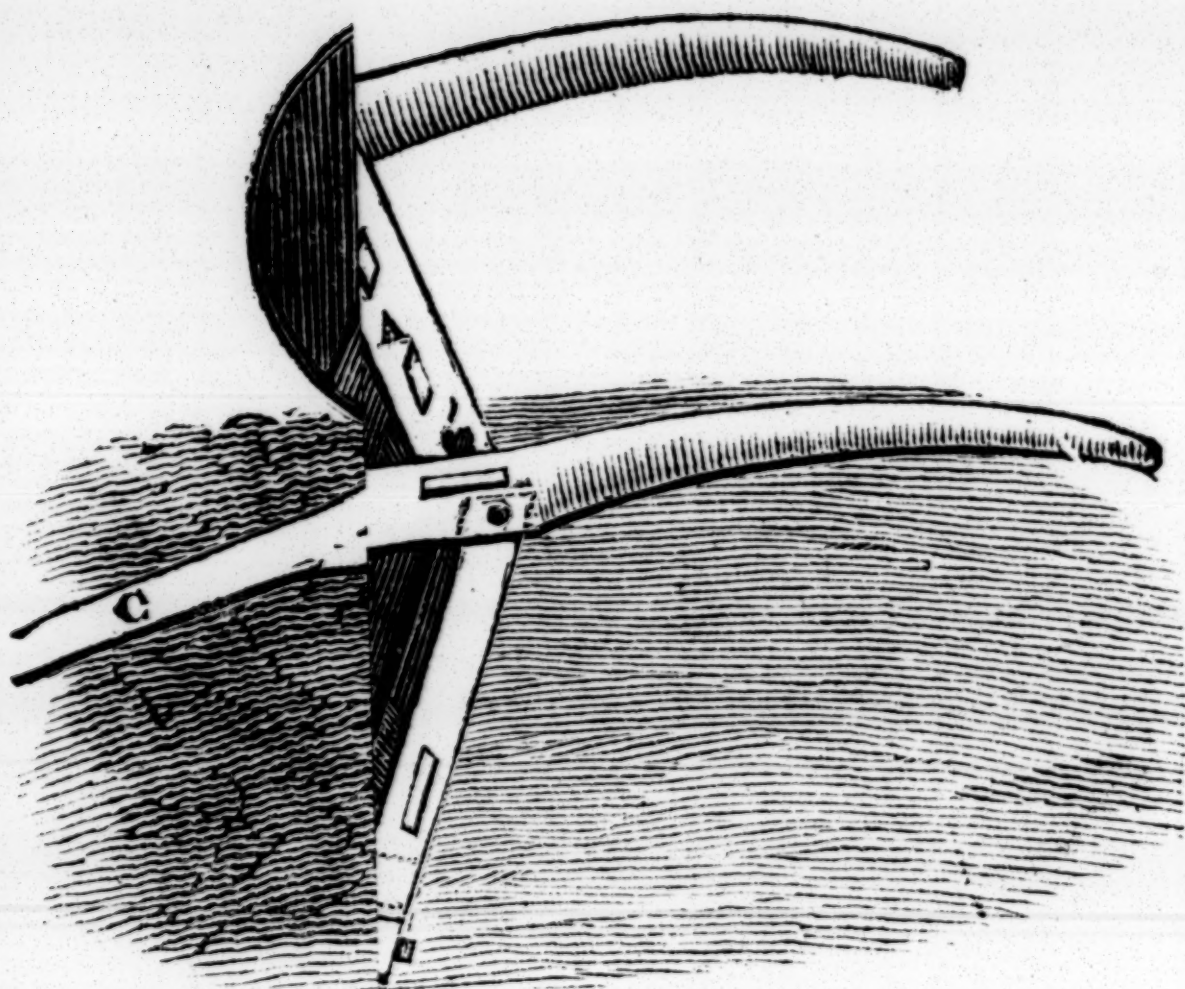
By which, with a common team of two horses and two bullocks, one driver, and two labourers, with two common two-horse ploughs, to loosen the earth, more ground is effectually levelled in a day, than fifty men could perform.

BY LT. COL. HARDY,
OF WESTMEAD, CARMARTHENSHIRE.

I HAVE levelled fourteen acres in one day, with the above instrument, and what will tend to prove the utility of it, perhaps, more, a common farmer has laid flat six acres, and last year it took all the labourers of this man's farm most of the summer to level seven acres, which was this year performed in a few days.

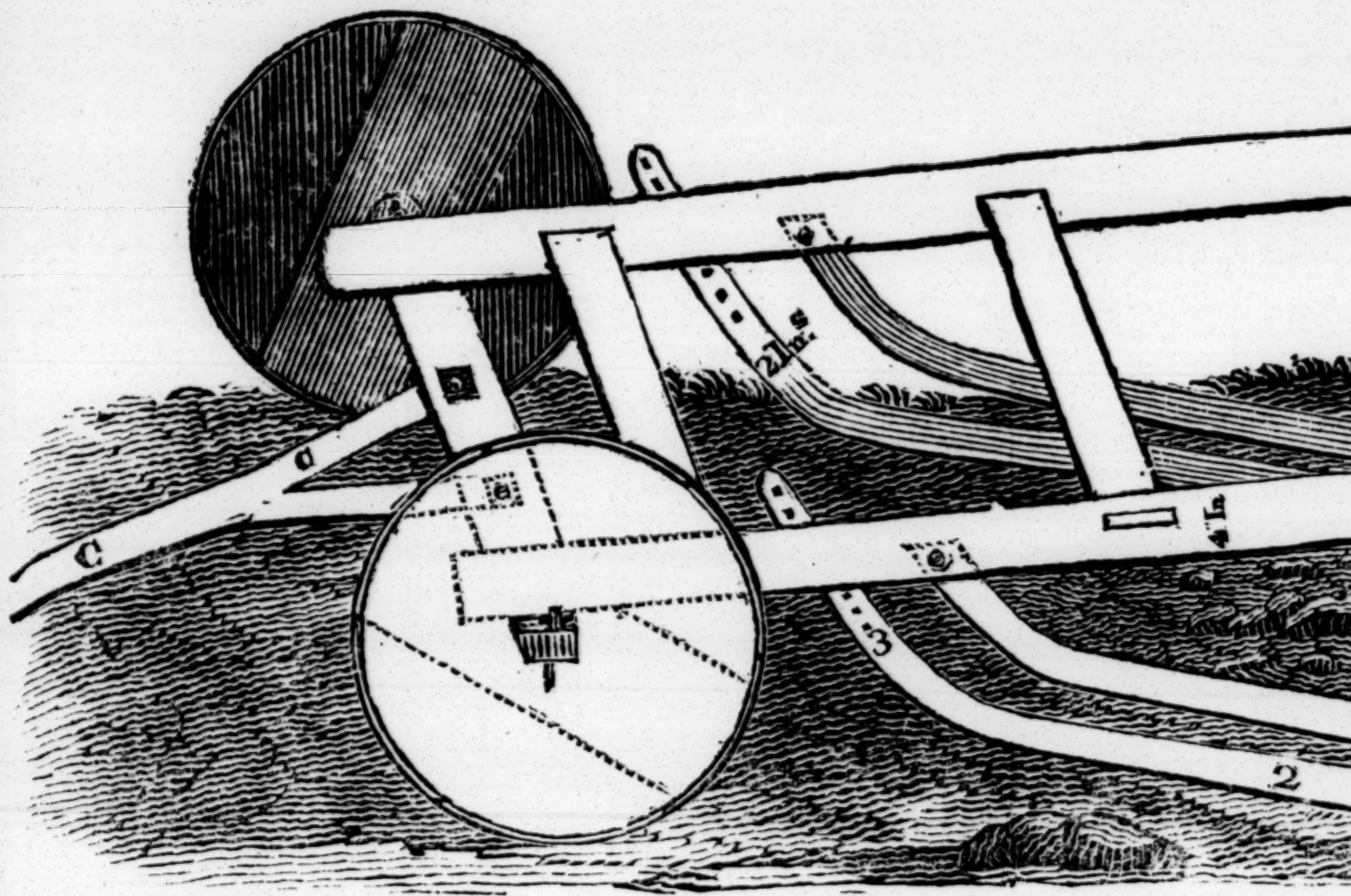
This instrument is the invention of my steward, to level the inequalities of ground, in order to be laid out in straight ridges, to get rid of old crooked drains, and will answer in any other work, where the levelling of ground is necessary, and where the space and depth of earth will admit its operation.

The



The sides as
 Breadth of cr
 Wheels two :
 The piece ma:
 The weight c





EXPLANATION

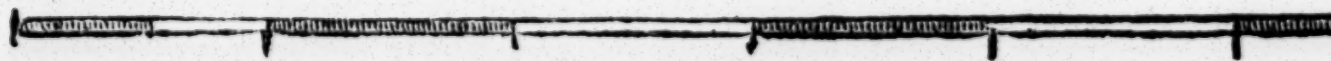
The sides as well as the back, are close boarded.

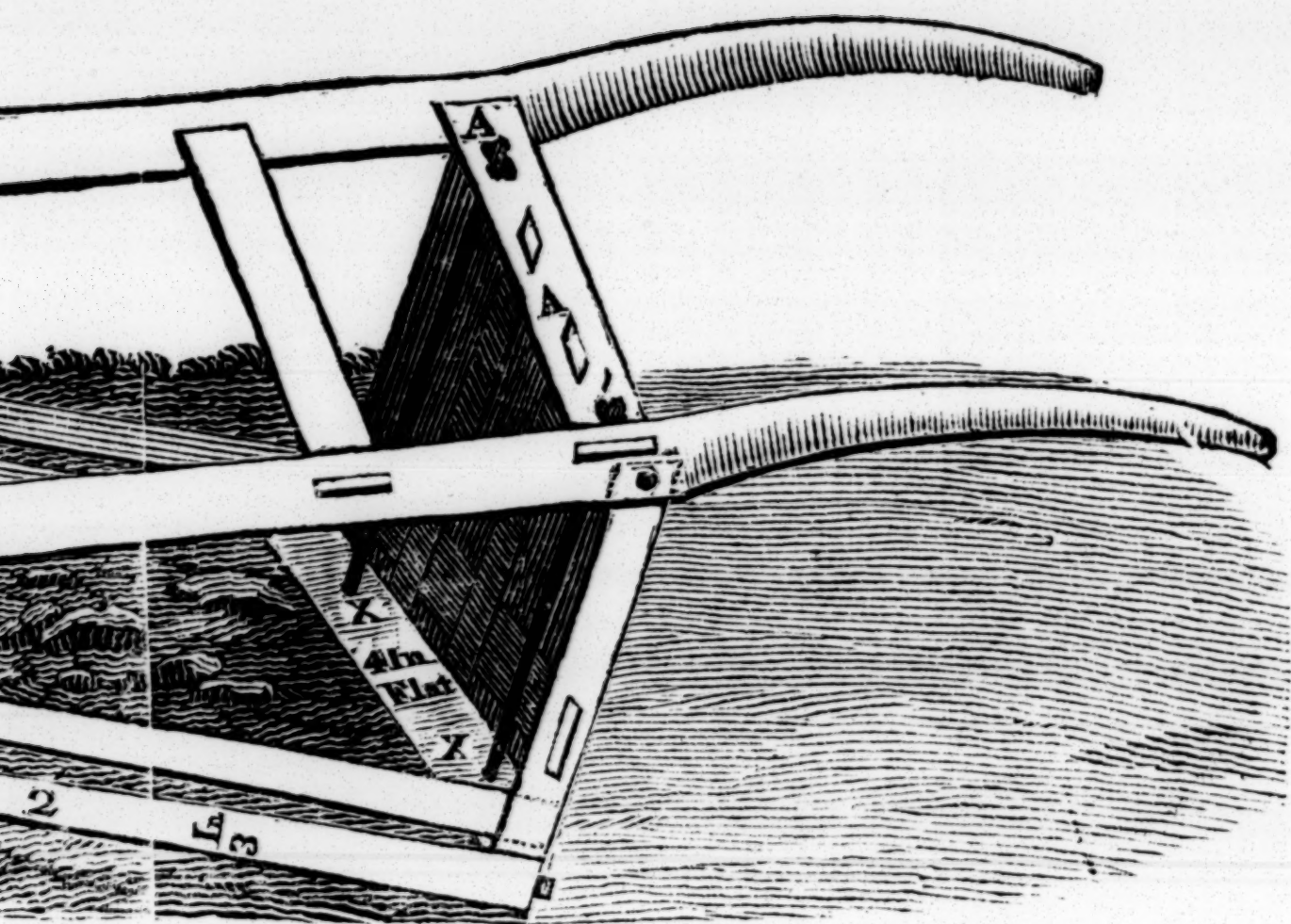
Breadth of cross tie pieces A. A. &c. three feet.

Wheels two feet diameter.

The piece marked X X, and the pieces 3, 2, 3, are of iron, beat out.

The weight of the iron, exclusive of the wheels, was 40lb, and cost about





ATION:

eat out sharp at the edges:
 oft about, £.1 : 5 : 0.



The ground it has been worked upon, is a deep reclaimed marsh from the sea, which, from the accumulation of stagnant water, has in many parts become a stiff clay, in others sand; its general shape before levelling was in two perch wide ridges, very crooked, the crown of which was two and three feet above the furrows, which were so flat, that, in grass, the breadth of five and six feet was lost by the sourness of stagnated water, and an equal or greater loss was frequently experienced when under grain. I am aware that its application cannot be general, but, where there is a depth of soil, no objection will arise from burying the surface sod, and bringing into *immediate* use that, which has not been before in action, from its lying deeper than the general effects of the plough, even for grain, where you can apply a reasonable share of manure, as I had a field of eight acres of barley, or poor stubble, inferior to none in the country, but that it was somewhat later. This field was not levelled until the middle of April, manured with lime compost, and sown late in May. Where drill crops, particularly turnips and potatoes, succeed levelling, there can be no danger of putting them into soil, which has not been exposed to the influence of the atmosphere, as it is generally admitted those crops do best in new soils. I have six acres of those roots in soil, which was not turned over but a few days before they were put in.

A neigh-

A neighbouring farmer, who has a good deal of this description of land, which bears the best corn in this country, attempted to level a field of seven acres, last summer, with plough, spade, and barrow, and it employed all his labourers the most of the summer, and cost him as many pounds, as it did shillings to level six acres of very stiff clay with the leveller this season. He has now a promising crop of cabbage and turnip in drills, growing in this soil, which was not turned over but a few days before sowing.

It is drawn by two bullocks, and two horses before them, a driver, and two men, one to each handle; two two-horse ploughs begin the work, (best on an oblong square, of course across the ridges) which loosen we suppose the tops of the ridges, eighteen inches in breadth, and six inches deep; as soon as the leveller comes upon the rise of the ridge, the men on each handle press it down, when the box fills by degrees, and is gradually deposited in the furrows. Where the ridges are narrower, or the land flatter, more ploughs may be applied. It took ten days to level the fourteen acres at Westmead, as there were several deep crooked drains to fill up; my neighbour levelled his six acres in four days, which in his opinion would have cost him the work of 200 or 300 men; any one, who has removed much earth otherwise, may have some idea of its expence.

Where

Where a system of drill husbandry is intended to be practised, (and grain cannot be kept free of weeds without it) it becomes indispensably necessary to get rid of crooked ridges, and lay out your ground perfectly straight, and in ridges of equal breadth; here its advantage will be great: narrow ridges, or drill crops, give straw strength to support its head, from the air admitted, and there is no loss in furrows, even in grass land, except from extraordinary fat sheep, as a mole plough will water-furrow fifty acres a day, with a common team, without turning up any sod. I remained in the field, while I saw seven acres completely done, in less than fifty minutes, without turning up a shovel full of earth.

JOSEPH HARDY.

To GEN. VALLANCEY, V. P.
of the DUBLIN SOCIETY.

WESTMEAD, 26 July,
1802.

11

20
20

TO THE
RIGHT HON. & HON. THE
DUBLIN SOCIETY.

It is about thirty years ago, if I am not mistaken, since the practice of drilling wheat was first recommended by our agricultural writers; I then considered it to be a new discovery, and continued of the same opinion until very lately, that happening to look into Lord Bacon's works, I found mention made of it, under the article *Vegetation*, in the following words, "that the *late trial to set wheat* was now left off, because of the pains and trouble it required." This shews, that this method has been tried before, contrary to the assertions of most, if not all our modern writers, who speak of it. It is in itself very immaterial, whether it was first practised thirty or two hundred years ago, if we were not apt to attach, in some cases, too much credit and consequence to any discovery we suppose to have been made in our own times, perhaps flattering ourselves, that we share some part of the merit of the discovery.

very. I can easily conceive why the drill husbandry, which requires an expensive complicated machine, and a good deal of management and skill, should not have made any great progress; but I am at a loss to account why a practice, which requires nothing more than a little additional trouble, and which, besides that, has been made use of, those many years, in several parts of England, for raising pease and beans, should not have been more generally applied to the culture of wheat, if it had been attended with that success, which the advocates for it assert. I am the more inclined to doubt the general success of that practice, from this consideration; that the great saving of seed, by this method, must have induced several to have tried it, those two years past, that wheat bore so extravagant a price, who would not otherwise have thought of it; and who, it is to be presumed, would have pursued it, if they had found it to answer. There are, I believe, few of those, who have turned their thoughts to the subject, that will deny that the accounts of the success of new discoveries in agriculture have been too frequently much exaggerated. What wonders were related and credited of the Anjou cabbage, Siberian barley, Tartarian oats, and many other plants, of which we now hear not a word? To prevent misrepresentations or exaggerations, and

to ascertain, more speedily and more effectually, the real merit of new discoveries in agriculture ;

I conceive, that every person, who should think proper to put his name to the account of any experiment made by him, ought (if he wished to have it made public) to get some of the best informed persons in his neighbourhood to examine it, and to sign the report made of the success. Exclusive of the truth of the old proverb, that two heads are better than one, it is well known, that, in matters of experiment, men of good understanding, and of the best intentions, frequently deceive themselves, and are the innocent cause of misleading others. For that reason those praise-worthy persons, who, from a truly laudable motive of serving their country, and benefiting mankind, publish their experiments, should take every possible precaution not to be biased by prejudice, which is far more likely to operate on those, who make the experiments, than on others. Notwithstanding the infinite number of experiments in agriculture, that have been made within this century, in England and Ireland, some of the most material points relative to it have not, I believe, been sufficiently ascertained. For example; do we know, in what degree any of the products of our soil enrich or impoverish it?

Do we know to a certainty, whether potatoes, or turnips, wheat, or barley, exhaust most the soil? Are we authorized from experience to say, in what degree the dung of well fed cattle is superior to that of lean cattle? Count Gyllenburgh (for whose Elements of agriculture in the English language we are indebted to Mr. Mills) says, that it is infinitely better. The same author asserts, that a mixture of lime and ashes rather lessens the quality of dung, than renders it better. Have experiments confirmed that opinion? To be certain of that is a matter of consequence, as it is a common practice in many parts of Ireland. Is it a fact, that the mode of husbandry, which is known to succeed in the deep, clayey, loamy, gravelly, or sandy soils of England, is equally well adapted to our soil, which, as Mr. Young justly remarks, has in general the rock near the surface? If potatoes were the food of four fifths of the people of England, as they are of the people of Ireland, is it probable that the farmers could cultivate turnips and clover, in the extensive manner they do at present? The advantages and disadvantages, attending different modes of culture, must be balanced before a proper estimate can be formed, which merits the preference, and that, I apprehend, has not been always sufficiently attended to.

There

There is, I believe, scarcely any point relative to agriculture, in which more people concur in opinion, than that long leases are beneficial not only to the tenantry, but to the country in general, yet I confess that I much doubt the fact; I consider the short leases, so general in every part of England, to have been productive of the restrictive clauses in them, to prevent the tenants from materially injuring the ground, and it is to those clauses that I attribute, in a great measure, the superiority of their arable grounds over ours. It is well known, that the best arable ground may in a few years be exhausted, by injudicious management, and that it is a long time before it recovers, to the great loss of the occupying tenant, who improvidently reduced it to that state, as well as of the country. Could any restriction, which tended to prevent the Irish tenantry from materially injuring themselves, as well as their country, be justly considered a severity? Would it deserve the name of one, if they were obliged, under a penalty, to sow a certain quantity of some kind of grass seed in every acre of ground, (except mountain) in which they should sow a second successive crop of oats, without an intermediate crop, or any manure? I cannot but think, that, if a clause of that kind had been introduced
into

into every lease made here, within those last fifty years, many parts of Ireland would have a very different appearance, from what they have at present; and Irish oats would be in much higher repute at foreign markets, than they now are. That our farmers in general want capitals, is a melancholy truth; but, instead of that being an objection to a restriction of this nature, which must ultimately tend to their own benefit, it seems to be an additional reason for it; as the farmer, who does not possess sufficient capital, to restore by rich manures* that degree of fertility, for want of which his ground remains in an unproductive state, must be a much greater sufferer by such mismanagement, than the farmer, who has the means of purchasing such manures, and of speedily restoring it to a productive state. I do not know, whether any of these loose cursory remarks are deserving the notice of the Society: that must be submitted to you, by

Your Humble Servant,

A MEMBER.

* The received opinion is, that neither lime nor sand, the two most general manures in Ireland, is proper for restoring fertility to grounds, worn out with over cropping.

AN ACCOUNT
OF THE
STRAW-HAT MANUFACTORY,
AT
NEWPORT PRATT,
COUNTY OF MAYO.

WILFORD-LODGE,
NOV. 26, 1802.

Dear General,

THE interest which you have been so kind as to take, in Mrs. Graydon's feeble endeavours to introduce the Dunstable Straw Manufacture into this country, induces me to take this opportunity, of giving you some account of the state of that business here at present; and indeed this is also justly due to the Society, who so very liberally bestowed their countenance on the attempt, while yet in its infancy. I have now the pleasure to inform you, that it gains ground rapidly every day; the aversion of the lower, and even of the middle classes, to every novelty,
and

and the ridicule, which it at first excited, being so completely got over, that all ranks concur in regarding it as an object of serious importance, and the children of the poor press forward in crouds to be instructed in it. Already we can reckon at least 200 children employed, and, as this country is extremely populous, and many of those, who have been taught, have now set up little schools, to instruct the children of their respective neighbourhoods, nothing more remains to be done, to carry it to a great extent, and a high degree of perfection, but the application of a little well placed encouragement. Of this, I hope it will not be attributed to partiality, if I venture to say, that it is truly deserving, from the desirable effects, which, experience proves, it tends to produce on the manners of the lower classes; your benevolence and public spirit will, I know, plead my apology, if I take the liberty of troubling you with a detail of some of these, which I have myself seen actually exemplified.

To you, who know the country of Ireland in general so well, I scarcely need observe, that, of all the members of an Irish peasant's family, the female children, below the age of ten or twelve years, are usually the most useless, the most helpless, and the most neglected,

glected, being, in fact, but a dead burthen on their parents; the boys can, at a much earlier age, contribute, somewhat at least, to their own maintenance, but the girls next to nothing, till they are able to spin; with them this important interval, when the young mind often receives those permanent impressions, which form the basis of character in life, is passed in sloth, in dirt, and contempt, of course, in total want of all self-respect, and, consequently, in the admission of the seeds of every vice. From females thus brought up, the contamination of morals and manners, which spreads to the other sex, and gradually pervades the whole mass of society, is, unhappily, too well known.

It would require but to see the manner, in which the straw business is conducted, to perceive, that scarcely any other, that has yet been devised, applies, with such immediate efficacy, to the relief of this poor little neglected, but most important half of our population, and, through them, to the removal of one very serious and abundant source of injury to the character of our people. The raw material being cheap, and easily procured every where, lies within the easy reach of the poorest; the preparing it for work, by cutting off the ears, or scutching out the grain, and then picking or cutting the straw
into

into joints, properly assorted, either forms an occupation for the evenings of the elder, or the younger members of the family, who employ a time, that would be otherwise lost, in this easy task, sitting round their fire-side: or this forms a distinct branch of work in itself, some families having already begun to occupy themselves entirely, in thus preparing straw to sell to the plaiters.

The straw joints, tied up in small bundles, are then bleached and stoved, for which operation several individuals are furnished with the proper information and machinery. The cutting and working up into plait, of the straw, is then done by girls, usually from six years, and even under that age, to twelve or fourteen, who have now acquired a dexterity and neatness of execution, that, to those who had seen them before their being engaged in this work, would appear almost incredible. But those, who first embarked in it, besides having the necessity of painful cleanliness impressed upon their minds by their instructors, soon learned, by dear-bought experience, the absolute necessity of practising this lesson, as they found, that soils from dirty hands or clothes, from soot, smoke, ashes, &c., were not afterwards to be cleansed off, and wholly destroyed their work, so as to make it unsaleable, and the later learners
have

have quickly acquired the same habits. The improvement, which has followed in the cleanliness, and even neatness of the persons, clothes, and dwellings, of these working children, forms one proof as striking, as it must be pleasing, of the beneficial tendency of this little manufacture.

But the main spring of the whole business is the quantum of earnings, which this employment enables these little ones, who had before been wholly unproductive, to derive from it, which in many, or rather most cases, equals or exceeds what their parents can procure from their daily labours, and which, according to their diligence or expertness, extends from 4*d.* to 1*s.* per day, and sometimes more; this soon produces a fund, from which themselves are decently and comfortably clad, and the other members of their families derive new and increased comforts, which, in some instances of good management, has already raised them to comparative opulence, and these, if the business extends and prospers, must become more and more frequent every day. The consequence to the young workers is evident, that they immediately exchange neglect for importance in their domestic circle, and will no longer allow themselves to be treated without ceremony, or with gross or indecent familiarity. This, I
can

can assure you, is no fanciful picture; but the distinction between the appearance and manners of our little working girls, and the other children of the country, is so marked, as to strike the observation of even strangers, in markets, or other general assemblages of the lower classes here.

The foundation of this business was laid in the beginning of the year 1797, in a small school collected here from our immediate neighbourhood; and as it was attempted without the least previous knowledge of the various processes by the instructors themselves, who were obliged to find their way by various experiments, and to make assiduity and perseverance produce the necessary information, the first attempts were proportionably rude, and the rebellion completely interrupted all progress in these, during the whole of the year 1798. In the summer of 1799, it was however resumed, and improved; still, though in a very contracted circle, the plaits sold producing little more than twelve guineas; in the following year, they amounted to about twenty-five, in the next, to upwards of sixty, and in the present, they have gone beyond 200l. This rapid increase, besides the improvement of the work itself, is very much to be attributed to the very zealous, and liberal co-operation and encouragement of the ladies

ladies of Sir Neal O'Donel's family, of Newport, and particularly of Lady O'Donel, who, when she experienced the good effects of the manufacture, in improving the manners and condition of the poor, immediately advanced a very handsome sum, in the form of a loan, to be circulated in the purchase of the plaits, and the support of a workwoman from Dublin, to make them up for sale, and added a further power of drawing on her for any additional sums, that might be required for its future extension, for which purpose she, and the ladies of her family, had plaiting schools formed in the town of Newport, which have succeeded, beyond expectation, in clearing that town of the troops of little idle children, that crowded it, and have set them all busily to work. The establishment is also much indebted to my very worthy friend, Mr. Roger Palmer, of Rush-house, and London, not only for pecuniary assistance, but, what is of still greater advantage, for most valuable information of some processes, which have contributed greatly to the improvement of the work, insomuch, that I hope I may be allowed to say, it is now equal, at least, to any produced elsewhere.

As the quantity of plaits produced has now extended beyond the demand of this country, for finished goods, to which it had
hitherto

hitherto been confined, and it is of the first importance to the success of the establishment, that a speedy and certain vent should be insured for all produce of the industry of the children, we have lately thought it expedient to open a public market, at the town of Newport, to be held on the first Tuesday of every month, for the sale of plaits, the first of which was held on Tuesday the 2d of November last; and, though with no more than a week's previous notice, we had the satisfaction of seeing it crowded with workers, who brought in, and sold there, excellent plaits, to the amount of about 16l. Lady O'Donel has since, with her usual liberality, proposed premiums for the best work, brought in to the next market, which will certainly produce the effect of exciting the emulation and industry of the children, and both improving the quality, and increasing the quantity of the work. I beg to submit it to your consideration, whether this might not be deemed an object worthy also of encouragement, by some small annual sum distributed in premiums, by your truly patriotic and enlightened Society, as a trifle even, from a body so justly distinguished, would not only strongly excite the industry of the workers, but attract also the attention of the public, to the great benefit of our infant market.

There

There is another line of encouragement of this infant manufacture, which I will take the liberty of submitting to your judgment, in which it strikes me, that the interference and patronage of the Dublin Society might produce the best effects, and not only to our particular establishment, but to the others of a similar kind, of which I understand that many have been set on foot lately, in various parts of the kingdom. You well know, that, in all new attempts of this sort, the principal difficulty to be encountered is, the procuring of a certain mart for vending the goods, as it would be vain to encourage the production of an article, without, at the same time, providing for its disposal, and the sure return of its value to the workers. In the outset of business of this kind, while the production is small, and the zeal of its supporters great, this is not found an important difficulty, private interest and patriotism furnishing a sufficient market; but when the production has got beyond the demands of the private circle, then the difficulty of disposal presses most seriously; and this has just now begun to be our case; not from any defect of merit in the work, or of moderation in the prices, at which it can be sold, but merely from newness and inexperience in the business, from want of knowing the roads to the general
mart,

mart, and the manner of travelling them; and also from a similar unacquaintance, in the purchasers, of the roads to us.

It has occurred to me, in thinking of different modes of overcoming this difficulty on both sides, that it might probably be, in a great measure, if not wholly, removed by the Dublin Society, if they would condescend to interest themselves in a concern, at present, of such small extent, by their proposing a premium, in the shape of a certain per centage, or otherwise, on the amount of plaits purchased, and paid for, in open market, beyond a certain moderate sum, suppose 10*l.* at one time; this premium to go to the purchaser, on producing proper certificates, or other authentications of the purchase: this might also be made to comprehend finished goods, bonnets, hats, &c. bought of the original manufacturers by shopkeepers, or other retailers of these articles. A very moderate sum bestowed by the Society, in this line of bounty, would quickly open the communication between the manufacturers, the finishers, and the retailers, which being once effected, the business, if it had merit, would soon be able to proceed upon its own legs.

Suppose, in addition to this, that some creditable person was encouraged, and could be prevailed upon, to open a repository in Dublin,

lin, for straw plaits and goods, by wholesale, (not by retail, or selling no less than 10l. worth to one person, to avoid opposition to the interests of the retailers,) this repository to receive and vend all goods from the country on commission, and to be allowed, for a given time, a small per centage, by way of bounty, by the Society, for goods disposed of, and the amount regularly remitted, on proper certificates to that purpose. Such an establishment would give the country manufacturers the great advantage of a certain known place, and mode of bringing their goods to an extensive market, and of disposing of such a redundancy, beyond the demands of their local markets, as might otherwise lie on hands, either a heavy burden on the undertakers, or a severe discouragement to the workers.

I hope you will not esteem it presumption in me, to venture to suggest these measures, or to think of occupying your attention, or that of the Society with them; in excuse, I cannot, indeed, plead the present magnitude of the object, but I think I can its very serious importance, from the strongest conviction, and most decided experience; and that, not only of its highly beneficial tendency, but also of its capability of extension, and of being brought to meet, and completely to overcome,

come, all rivalry from foreign competitors : and that this is a consideration of magnitude, sufficient to be regarded even as a national object, will appear from the amount of these goods annually imported into Ireland, which, I understand, can be clearly ascertained to be no less a sum than 100,000*l*. Now, when it is considered, that this manufacture requires no extensive capital, either for the raw material, or machinery ; that it must be the work of the fingers, and can be effected by children, whose labour, in any other line, is of little or no value ; I believe it will easily be admitted, that no branch of business exists, perhaps, in which this country possesses such decided capability of excluding rivalry from any part of Europe, but particularly from England, as in this ; and, in fact, it is found that, in England, straw goods have, of late, instead of diminishing, considerably increased in price, from a great increase of demand, and a limited production, so that large imports are every day made, both there and here, from Leghorn, all of which, by the encouragement of our manufacture, might be superseded, and their place supplied, also in England, from this country ; for I have no doubt that, cheap as the Leghorn hats are, we could soon undersell even them.

As

As to the extensibility of the business, I can venture to say, that my parishes here could furnish at least 7 or 800 workers, and I find it is spreading fast, among the poor themselves, into the adjoining parishes of Westport and Castlebar, without any countenance or encouragement from the upper ranks there, but merely from the spirit of imitation, and the allurements of gain. In the populous and extensive district of Tyrawly, I understand it is also extending, and is patronized by some worthy and liberal families, who interest themselves in improving the condition of their poor. I therefore can venture to assert that, beyond a doubt, public markets for the goods, once established, would quickly bring forward thousands of workers in this county alone, and if the demand would support it, the example could not fail to be followed in the adjoining counties.

Allow me to add, that this may justly be considered in the light of an agricultural, no less than a manufacturing object, and, in proportion as it extends, must certainly operate to the extension of agriculture, not only by increasing the price of one of its products, which it has even now done in our little district to double, but by the profits centering in the families of tillers, who are thereby both enabled and induced to increase their tillage,

to raise a sufficient quantity of material for their children to work, on their own ground. As I speak from actual knowledge of this effect, I shall not scruple to mention it, as some ground of claim to the patronage of the Dublin Society, and an object not unworthy of their attention.

There is one objection, which I have heard frequently repeated, to the establishment of any straw manufacture, to which, as it seems to have made some impression on the minds of those, who have not bestowed much attention to the consideration of the subject, I beg to say a few words; the objection is, that this work is only supported by the fashion of the day, and that, of consequence, if the fashion should change, as it may in a moment, to some other fabric, as a substitute for straw hats, the whole business must instantly fall to the ground, and all the people concerned in it be thrown out of employment, and reduced to penury and distress.

To this I would answer, in the first place, supposing the case stated to take place to the utmost possible latitude, and that every kind of straw fabric was suddenly to fall into total disuse, so as to afford no further earnings of any kind to the workers; yet, as this would neither abolish the emoluments, which had been received by them previously, nor
the

the excellent habits of industry, cleanliness, culture, &c. which it had created and exercised, which would soon find other objects to apply to, it is clear, that the offspring would survive the parent, to the permanent benefit of society. But, at all events, in this country at least, the emoluments which it should afford, however transitory, would be all clear gain, and the failure of them no absolute loss, the workers being almost all children, who had earned next to nothing before, and who could not therefore be accounted losers, if thrown back to their former situation. This would be far from the case in England, where the workers are almost all grown persons, and yet we find, that this apprehension of a sudden failure of the fashion, and disuse of their work, does not deter them from continuing it, so long as the demand exists. In fact, was such an apprehension to have that effect, I know but few lines of manufacture, which might not find reason to be alarmed by it, and kept in continual suspense, and scarcely one that could properly be said to be wholly out of reach of its application.

But although the finer fabrics of straw should be discarded by the upper classes, I cannot easily believe, that the coarser would be consequently disused by the middle and lower classes, who usually wear any covering
for

for their heads, from its manifest utility, its lightness, neatness, cheapness, and defence against the weather, and its durability; and that this would prove the case, may fairly be inferred from the well known circumstance, that, long before it became an article of fashion among the opulent, it had been in such general use, as an article of convenient dress among the middle ranks, that imports to a large amount have been made of it into England from Leghorn, and that so long ago as forty years and upwards.

That straw work has now become, in England, a manufacture of very serious importance, so as even to interest the community at large, and the nation in its support, must appear from even a loose conjecture of the possible annual amount of its productions, which, supposing the exports to this country alone to be, as I have heard them rated, to the value of 100,000*l.* annually, cannot be less than four or five times this sum at least. Can we then reasonably suppose, that an enlightened and patriotic people, like the English, would in a moment, through any caprice of fashion, suffer an object of this magnitude to perish, and throw the thousands, at present supported by it, a sudden burden on the public?

But I fear I have been led, by a subject in which I cannot avoid being deeply interested,
to

to trespass too far on your time and patience,
for which I confess I have no other defence
to make, than to throw myself on your indul-
gence, assuring you that I am, with great
truth, and most sincere esteem,

Dear Sir,
Your obliged and very faithful
Humble Servant,
GEORGE GRAYDON.

TO GENERAL VALLANCEY,

V. P. OF THE DUBLIN SOCIETY.

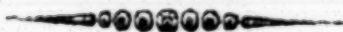
EXTRACT

EXTRACT

FROM A

SECOND LETTER,

DATED, JAN. 1st, 1803.



OUR December monthly market, which was the second since this establishment, produced a sale of plaits to the amount of about thirty guineas, several of which I had the pleasure to see purchased by poor, but independent working women, who have lately learned the art of making up bonnets, and other goods, and have commenced the conducting of this business on their own account and funds; and this, I find, has hitherto succeeded extremely well with them, as their capitals are yet but small, and the country furnishes a sufficient demand for all the goods they are capable of finishing; but this local demand being, of necessity, very limited, and the production of plaits extending rapidly every day, our great desideratum is to provide a vent for the surplus, commensurate to this extension: for this we must look principally

cipally to the capital, the great mart of the kingdom for every article, in which fashion has any influence.

I am, Dear General,

With truest esteem,

Your very obliged and faithful,

GEORGE GRAYDON.

FURTHER

FURTHER OBSERVATIONS
ON THE
UTILITY AND PRESENT STATE
OF THE
STRAW-HAT MANUFACTORY.

1. To those who consider the enjoyment of domestic comfort and society, and the retaining of native innocence, simplicity, and worth of character, as an object of much greater importance and desire for the lower classes, than the absolute and numerical quantum of earnings, which they might possibly be enabled to acquire from their labour, or the attainment of the highest possible perfection of a manufacture; to those who esteem the blush of health and of modesty as a greater blessing to its possessor, though unformed, and uncouth in manners, than the full purse which may accompany the faded cheek of the forward and confident; to those, in short, who regard the quantity of happiness and of moral excellence, to be derived from certain employments, by the persons engaged in them, as the primary object, and the quantity of specie as only a secondary one; it will readily occur, or be easily admitted, that such branches of manufacture are peculiarly worthy of encouragement, as require no assemblage of workers into large and indiscriminate companies or groups, in factories or towns, but admit of being carried on at home, in the distinct houses of the workers,
and

and in their own unmixed family circle ; and still more so, such as furnish an easy, pleasant, and not unwholesome occupation to every individual of this circle, of every age or sex. Joint employment like this, animated by a fair prospect of honest gain, and sweetened by mutual society and intercourse, by the chearful encouragement of the parents, and the ardour, and various sanguine speculations of the children, forms, altogether, a mass of pure and exalted enjoyment, which it is impossible to appreciate by money, and which would be ill exchanged indeed for ten fold earnings in the coarse depraved mirth, and contaminated intercourse of a factory. This happy capability of being conducted in the distinct houses of the workers, the straw business possesses in a remarkable degree. In this manner, after the first instruction of the children, which is quickly communicated, and to moderate assemblages of them, the work is now carried on here, but with frequent personal inspection and superintendance, of such as are in progress, and not yet arrived to steadiness and perfection of work, which office is frequently intrusted to, and well executed by the more advanced workers.

2. The indispensable necessity of cleanliness in the conduct of this manufacture, is a circumstance which draws after it a train of happy consequences too numerous to admit of, and too obvious to require being detailed ; I shall specify only one, which is, the clearing the cottages of smoke, by the construction of proper chimnies, which has already taken place, in some instances, expressly for the sake of this work alone.

3. These little, and hitherto neglected children, have, in many instances, enabled their parents to clear off arrears of rent and debts, incurred during the late hard seasons, which might otherwise have reduced them to severe distress. In other cases, they have added materially to the stock and profits of the little farm, by laying out their accumulated earnings in the purchase of calves, sheep, pigs, &c. and not a little, also,

also, to its cultivation, by sowing and rearing such crops as should furnish them with the proper straw for their work.

4. Those who know the difference between the Leghorn and the English straw-work, which indeed, is very marked, will require little trouble to convince themselves of this fact; with the attention directed to this object, a few hours walking through the frequented streets of Dublin, on a fine day, will evince, that the quantity of Leghorn straw-hats worn there, nearly, if not fully, equals that of the English. These latter, having now risen to extraordinary high prices, are only within the reach of the opulent, at least the finer kinds of them, while the moderate price of those from Leghorn brings them within the compass of those of more moderate circumstances, or more œconomy. With this fact staring us in the face, can any person who regards the prosperity of this country, hesitate to encourage an Irish rather than an Italian fabric? or will the most interested advocate for English manufacture in exclusion of Irish, will even the English wholesale dealers in this article themselves, scruple to admit that it would be more desirable, and more for their interest, as well as ours, to have this immense surplus of goods, beyond what their production can supply, furnished by Ireland, rather than by Leghorn? In truth, in matters of this kind, it is vain to talk of liberality; interest is the only existing and actuating motive. When the English dealers shall see, and shall convince themselves, as I trust will one day prove the case, that they can furnish themselves, from Ireland, with goods superior in quality to the Leghorn, at an inferior price, there is not a doubt that they will recur to Ireland, instead of Leghorn, for their supply.

Besides the plaits brought to market, and sold there, I find that a very large quantity, which it is not possible to form any estimate of, is sold in private; this is particularly the case with some of the best workers, whose plait is often bespoke, and reserved for particular orders; it is also generally the case with inferior workers and beginners, whose work
would

would not find a sale at market : and in many cases, the parents of working children prefer having the plaits made by them, sewed up into bonnets, and hawked about, at low prices, in the markets of the neighbouring towns, or the country. Considerable quantities of goods are disposed of in this way, and have been for some time back, which, if it were possible to take into the estimate, would make the amount of the product of this little manufacture considerably greater than what I have stated it.

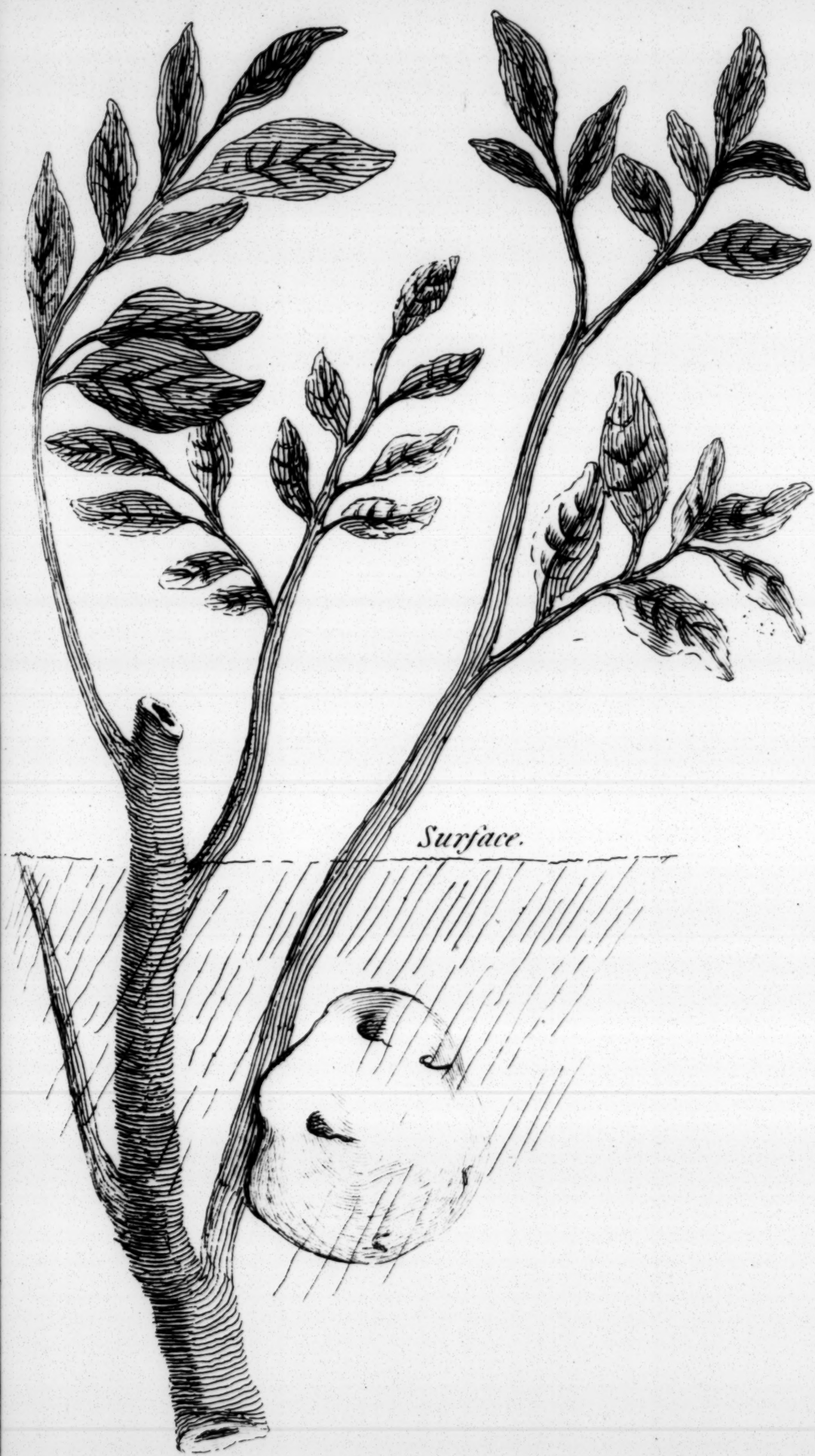
SECOND LETTER
FROM THE
REV. MR. MOORE,
ON
RAISING POTATOES,
*BY PLANTING CUTTINGS OF THE STALK.**

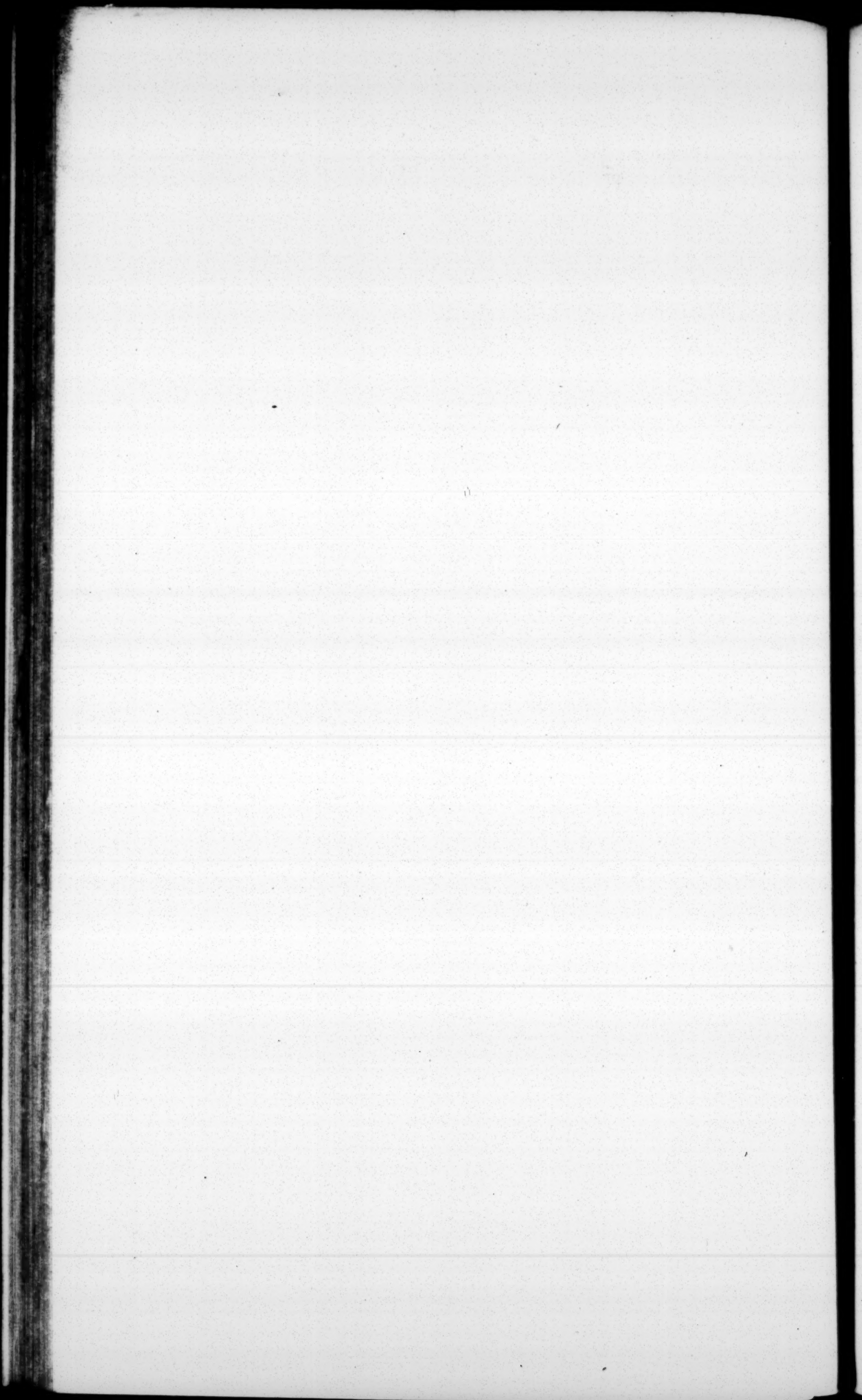
NOVEMBER 26th, 1802.

SIR,

I last year took the liberty of troubling you with an account of my producing potatoes, from cutting off the tops and planting them; I this season tried the experiment again, and now send you the result. On the 6th of April, I planted three small horseleg potatoes, whole, in my garden; on the 29th of June, they were above a foot high, and had each many stems; of these I cut off several, about eight inches long, which I planted with a dibble; they all grew a little, but four in particular

* See Transactions, Vol. 2. P. 2.





ticular got up fifteen or sixteen inches ; two of these I cut down about half way, a few side branches and leaves remaining to support the plant. It was then the middle of August ; the tops cut off were dibbled into the ground as before ; they soon shewed that they were able to support themselves, as the leaves ceased to droop ; when they finally began to wither, they were all taken up ; each had a potatoe attached to it, and of those first planted some stalks produced four large potatoes. One of the stalks shewed a few fibrous roots, but all the others were as devoid of them as when planted.

I herewith leave a stalk, with two potatoes attached, which will explain the appearance better than words. I had a much prettier specimen, but unfortunately broke off the potatoes from the stem.

I think your botanical students may draw some curious inferences from this discovery. I assert (contrary to one of the English writers) that the potatoe is by no means an impoverishing crop, even without dung ; for my experiment seems to prove, that it draws most of its nourishment from the air, and if this be the case, go one step further, and take its umbrageous leaves into consideration,
you

you must then conclude, that it is a crop highly ameliorating to the soil.

I have the honor to be,

Sir,

Your very humble Servant,

C. W. MOORE

NO. 10, DAWSON-STREET.

TO GEN. VALLANCEY.

A LETTER
FROM
MR. STEELE,
RELATIVE TO PREMIUMS FOR
REARING CATTLE.



MONALTY, NEAR CARRICKMACROSS.

MARCH 14th, 1802.

SIR,

THE circumstances of the times, relative to stock, impel me to trouble you, hoping that something may fall from me, worthy the attention of the Dublin Society, as a matter advantageous to the kingdom in general. From some very excellent information in England, where, I have a correspondence, I find that, from the consequences of the war, it is not expected that the stock will be full there for some years; the yearly drain of cattle and sheep, from this kingdom to that, it is unnecessary for me to point out. From my own concern with country business, I have been able to obtain the following facts; that, in summer 1800, vast numbers of the dead carcasses of yearlings, bullocks, and heifers, appeared

appeared on horses backs, in such of the markets of this province, (Ulster) as I have either seen, or heard of (in some paltry markets from 60 to 100); the manufacturers of these parts thinking such meat, though then high priced, cheaper than oaten-meal, at the enormous price it then bore, and for which reason the rearing of calves and pigs, in that year, was entirely neglected, as their food interfered so much with human sustenance. The same causes (except in the slaughter of young cattle) existed in 1791, and 1792, and therefore very few calves were reared, and I am sorry to have in proof to add, (what every man of observation, who may have attended fairs, must allow) that very few yearlings have appeared in fairs for two years past, and all men know how scarce sheep are at present; I therefore, Sir, beg leave to submit through you, how useful present encouragement might be, and that the Society should for this year hold out a general premium for every calf of this year, over a certain number, reared by any individual, three months old on the 1st of November; and also for every score of lambs, alive at same time, throughout those districts, that have bred for the butcher, only, suppose Leinster and Ulster, as I conclude, that Munster and Connaught, being fond of, and in the habit of rearing,
stock

stock for Leinster and Ulster, require no encouragement for lambs; but I do not mean to include mountain lambs in any country, as those animals are far inferior to those I would preserve by the premium, and must, of necessity, be reared into sheep. I should think, that five calves, and upwards, would prove the most useful number to encourage, and to give a higher premium from that to ten inclusive; and I would also, after three score lambs, decrease the premium, as the best stock is not generally reared by breeders of the greatest number, and the very name of a premium, for any, will prompt both the breeders of calves *under five*, and of lambs under a score in number, to rear what they can. It is a doubt with me, whether it would be most prudent to restrain claimants from claiming on those they may buy, or not, as the very buying, for the sake of claiming, may preserve the life of the animal; in that case, suppose the affidavit should be obliged to prove, that either calf, or lamb, were bona fide the property of the claimant, from the 1st of July preceding; the traffic of couples, that is, a sheep and lamb together, being already very common till about that period; and should these premiums be advisable, they cannot be too soon made public.

Pigs

Pigs being so prolific an animal, and carrying so much encouragement in themselves, will, I presume, effect their speedy increase, and the Farming Societies sufficiently encourage their quality ; but should the misfortunes of war again break out, before these funds of living stock are replenished, it may prove a great inconvenience to the state. At all events, rearing stock for England has been very productive to Ireland, and cannot fail of being so for some years longer.

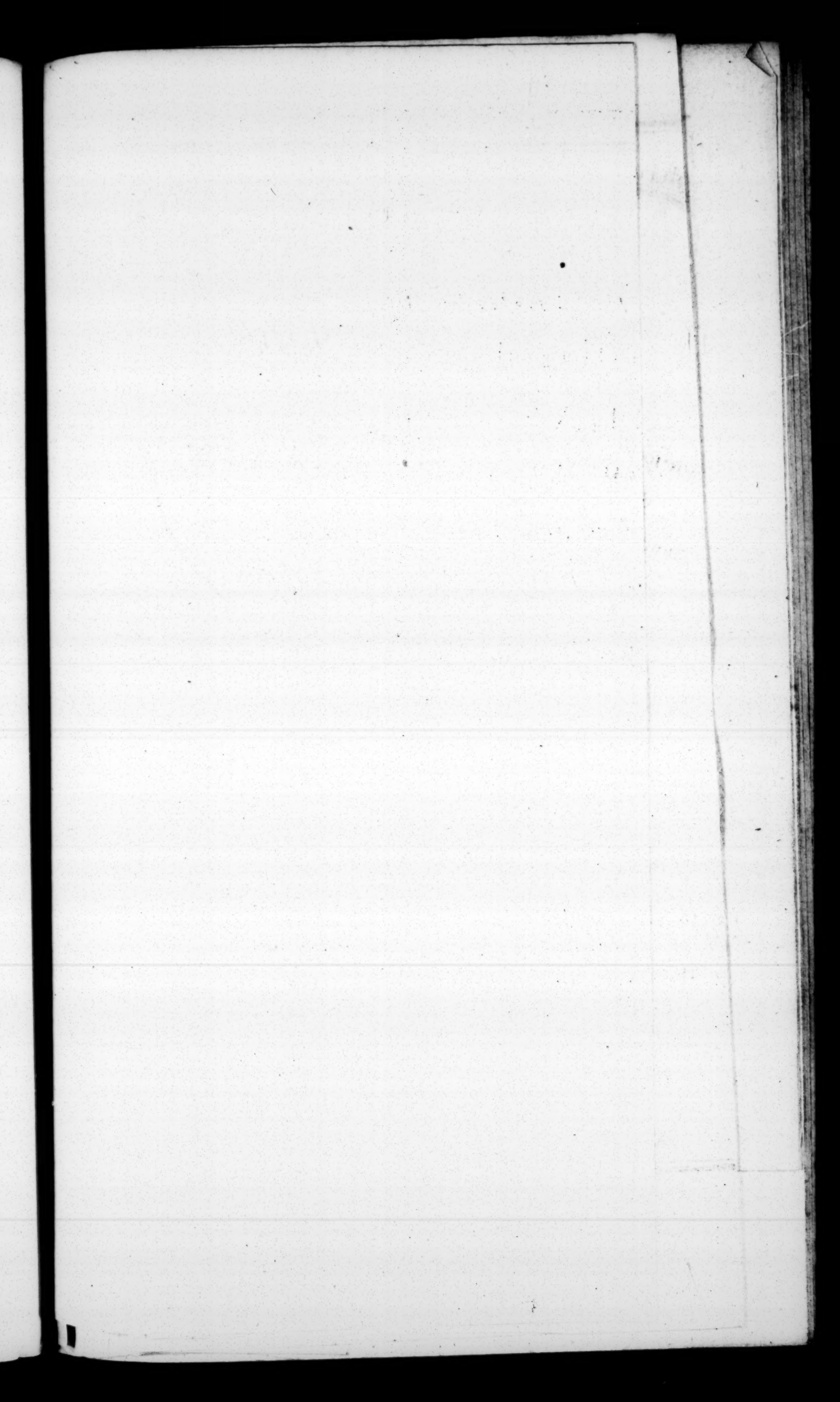
I have the honor to be,

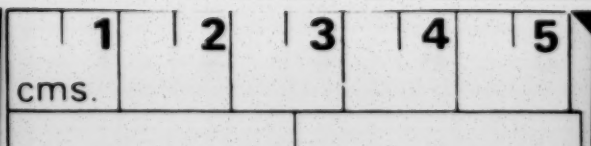
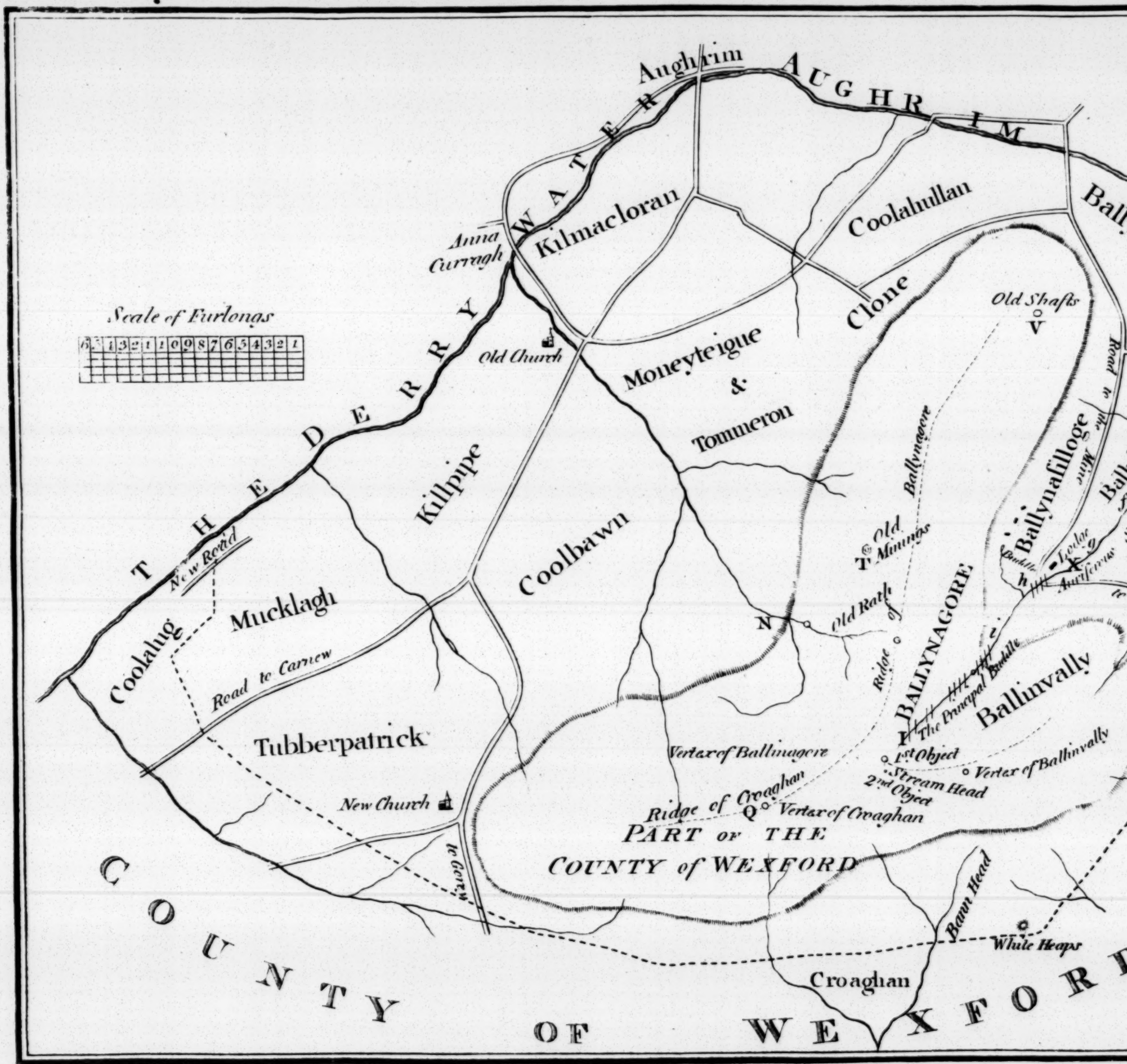
Sir,

Your faithful humble Servant,

NORMAN STEELE.

TO THE SECRETARY
OF THE DUBLIN SOCIETY.





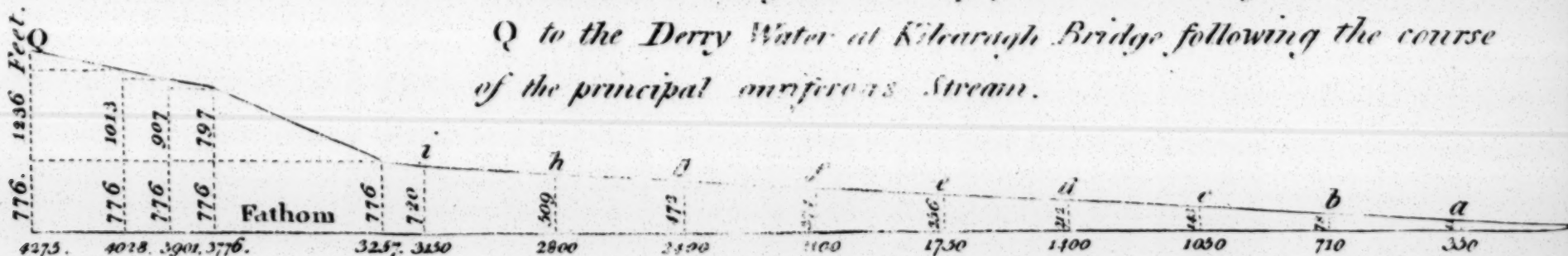


. MINERALOGICAL MAP
 comprising the BASE of
CROAGHAN MOUNTAIN
 in the COUNTY of WICKLOW.

Survey'd by Order of Government
By T. Harding.

Engraved by J. Taylor at Donnybrook near Dublin.

Section Shewing the declivity of the Mountain from its Summit
Q to the Derry Water at Kiltahader Bridge following the course
of the principal auriferous Stream.



Name of the Place and Mine.	Substance of the mountain including the veins.	Substance of the vein.	Mineral contents of the vein.	Range or direction of the vein.	Breadth of the vein.	Depth of the work.	Length of the level.	Annual produce.
Croaghan, Kinsella mountain, in the county of Wicklow, Ireland. N. B. No mine is yet opened, a stream work only being wrought under the order of government.	Granite, on which is incumbent argillite and shiftus.	Quartz including chlorite.	Martial pyrites, and iron ochre.	N. N. E. $\frac{1}{2}$ E. to E. N. E. $\frac{3}{4}$ E. and S. S. W. $\frac{1}{2}$ W. to W. S. W. $\frac{3}{4}$ W.	From 9 inches to 4 feet.			oz. dwts. Aver. 317 13 Native gold.
Subdenominations being parts of Croaghan mountain. } Ballinagore. Ballycoog.	Argillite. Argillite.	Quartz including chlorite. Quartz and argillaceous shift.	Magnetic iron ore, and martial pyrites. Magnetic iron ore, blende, yellow copper ore, & martial pyrites.	E. S. E. and N. N. W. E. N. E. and W. S. W.	From 18 inches to 2 feet. 5 feet.	1 $\frac{1}{2}$ fathom. 8 fathoms.		
SWEDEN. Adelfers, province of Smoland. See Jars' Voy. Min. Tom. 2. f. 55 and 75.	Shiftus.	Quartz, corneous and argillaceous shiftus.	Auriferous martial pyrites, and native gold.	N. E. and S. W.	2 feet.	50 to 60 fathoms.	180 fathoms.	oz. 96 of gold.
SALTZBURGH IN THE TYROL. Gold mines in the mountains } Hernzuberger and Roheburg. } Jars' Voy. Min. Tom. 2. f. 79. 81. Kirwan, vol. 2. p. 98.	Argillite or Shift.	Quartz.	Native gold, and arsenical pyrites.	N. E. by E. and W. by N.	From a few inches to 3 & 6 feet.			oz. oz. 272 to 416 of gold.
NORWAY. About 50 leagues north of Christiana and } 30 leagues from Kienberg. } Jars' Voy. Min. Tom 2. f. 93.	- - - -	Quartz.	Auriferous pyrites.					
RUSSIA. Gold mines in the Uralian, the Olonetz, the Kohlyvan, and Nertschink mountains. } In the Ural is the celebrated mine of Berefof, and in its vicinity are gold stream works. } Took's Russia, vol. 1. p. 99 172. vol. 2. p. 534. vol. 3. p. 412. 415.	Various.	- - - -	- - - -	- - - -	- - - -	- - - -	- - - -	19,200 oz. of gold.
ITALY. Piedmont, the mountains from Lake Maggiore to the River Doria. } Gold stream works in the rivers, in the vicinity of those mountains. } In the mountains of Macugnaga, are the gold mines of St. Marie, and Cava Vecchia; above Emareze are gold stream works. } Journal des Mines, No. 50, Brumaire, An. 7. f. 149. 152. 162.	Chiefly argillite. Granitic shiftose, quartzose, and serpentine.	- - - -	Auriferous.	- - - -	- - - -	- - - -	- - - -	1280 oz. of gold. 320 oz. of gold.
HUNGARY Schemnitz. The principal vein is worked to - Spitaler vein, - Three Kings and Pacher Stolne, - Hoffer Staln E. of Schemnitz, - Saint Anthony of Padua. Jars' Voy. Min. Tom. 2. f. 120. Born 121. Creminitz. Jars' Voy. Min. Tom. 2. f. 192. Born 121. Nagyag. Born's Travels, p. 104.	Metallic rock, the porphyry sienite of Werner, described by Born to be argillaceous; grey rock mixed either with schist or quartz, or calcareous spar grains. do. do. do. do.	Quartz and Zinnople. do. Quartz, spath, and pyrites. White and amethystive quartz, and spath. White quartz.	Auriferous silver in black and yellow blende, sulphurous and arsenical pyrites. do. Vitreous silver ore & red silver ore in blende, richer in gold, than those of Schemnitz, and also contain native gold Red, vitreous, and white silver ore, and blende. White and red silver ores, native gold, and auriferous pyrites.	N. E. and S. W. do. do. N. E. and S. W. E. N. E. & W. S. W. N. and S. N. E. by N. and S. W. by S.	From several feet to several fathoms. do. do. do. 3 fathoms. From 12 to 15 fathoms.	3141 faths. 6000 faths. 200 fathoms. 127 fathoms. 87 fathoms. below that, not so rich. 60 fathoms.	402 fathoms.	L. 175,000 sterling. L. 11,666 on an average for 20 years.

Name of the Place and Mine.

*Substance of the m-
tain including the ve.*
ce.

SECOND REPORT, &c.



SIR,

IN the Report of the state of the Gold Mine, which, pursuant to the orders of his Excellency the Lord Lieutenant, we had the honor to present in August last, it was proposed, that an accurate survey of Croaghan Mountain should be made, and it was suggested that the driving a level to the north-west, to cross all the veins hitherto seen, might, if undertaken, be productive of some very valuable discovery.

The proposal for the survey being approved by his Excellency, and having been completed under his orders, we have now the honor to send the plan and section of the principal auriferous stream, and the map of Croaghan, which exhibits the course of the several streams descending from the mountain, distinguishing such as on trial have been proved to be auriferous. In the report above alluded to, it was pointed out that the south-western flank of Croaghan

G

exhibits

exhibits tumblers of granite, and it was conjectured that granite formed the base of that side of the mountain; this conjecture has been verified by an examination of the western branch of the Coolbawn stream, in which the granite is seen in firm massive beds, whose joints range E. by S. and W. by N. The other parts of the mountain are apparently composed of blue argillite, varying much in its texture from massive and coarse grained, containing minute particles of quartz, and passing thence through all the intermediate states into perfectly smooth laminated shistus, in which cubical martial pyrites are frequently interspersed.

In many different parts of the mountain, the blue argillite is penetrated by quartzose veins, which generally follow the range and inclination of the argillite; and ascending the principal auriferous stream from the ford, in the space of little more than one hundred fathoms, there have already been discovered four veins of quartz, and in the space of about six hundred fathoms from the upper buddles at I. twenty-three veins of quartz. In the whole twenty-seven veins, ranging between 1 and 8 east, and from nine inches to four feet wide; and it is probable, that many other veins are concealed beneath the clay and gravel, accumulated between *b.* and *i.* and also in the turf bog, which extends nearly to the summit of Croaghan, where

where amongst the bare rugged rocks of argillite, with which it is crowned, a vein of quartz is seen containing chlorite, and ranging to the N. N. E. and some superficial trials, made in the course of the last summer on one of the veins above the ford, and on others above the upper buddle, shew that near the surface they generally contain chlorite, iron ochre, and martial pyrites.

The stream work on the principal rivulet has been wrought from *f* to *b*, in length upwards of six hundred fathoms, and, with the native gold, there have also been found fragments of magnetic iron ore, specular iron ore, brown and red iron stone, garnets, tin stone chrystals, wolfram, grey ore of manganese, quartz containing chlorite, iron ochre, martial pyrites, and magnetic sand.

On the Killahurler brook and its branches, in the several trials, there was found some gold; the quantity and also the particles were small, yet there was found therewith pyrites, brown and red iron stone, magnetic iron ore, and magnetic sand, and on Moneyglough some tin chrystals.

On the Coolbawn stream, where a slight trial was made at N. some small particles of gold were found, accompanied, like the foregoing, with magnetic iron ore, pyrites, and red iron
G 2 stone,



stone, and magnetic sand, with the addition of some small fragments of tin crystals.

The streams, which issue from what may be termed the back of the mountain, namely the Ban on the south-west, the Bally-thomas on the west, and another on the north, were (prior to the operation of government) searched by the peasantry, and abandoned by them from their containing no gold.

North-west from the ford, and at a short distance from the ridge of Ballynagore mountain at T, are old mine works, which have been wrought in open cast a few fathoms in length: these works we cleared out last summer, and found them about nine feet deep, and the vein from eighteen inches to two feet wide, ranging nearly E. S. E. and W. N. W. and consisting of quartz, containing chlorite, magnetic iron ore, and martial pyrites.

About sixteen hundred fathoms from thence, to the north-eastward on Ballycoog mountain, are also old mine works at V. and, amongst the refuse vein stuff still lying about the shafts, are found masses of quartz blended with shistus, and including chlorite, magnetic iron ore, blende, yellow copper ore, and pyrites. From a sketch of these workings, supposed to be drawn about the year 1769, and now in my possession, it appears that the vein was sunk upon to the
depth

depth of about eight fathoms, and was proved to be five feet wide, ranging W. S. W. and E. N. E. and, in the latter direction, may be seen in the banks of the river Avoca, where it is two feet six inches wide.

After the recital of the foregoing facts, a reference to the map becomes more immediately necessary, as it will directly shew that the substances, which have been actually extracted from the veins, which have been tried in Ballynagore, and Ballycoog, might from the form of the ground, when detached from the upper part of those veins, in remote times and before the surface of the rocks was covered with a coating of earth, the result of decomposition and vegetation, be easily transported by such floods, as are even yet frequently produced, over the general surface of the mountain, by heavy storms of rain, and the melting of snows, and might be deposited where they are now found. Those from the north-western side of the mountain, in the Coolbawn stream, and those from the south-eastern side, in the principal or Ballinvally stream, and having thus attained some degree of certainty as to the veins, from whence some of the substances found in washing may have been formerly detached; it seems neither to require any great stretch of imagination, nor to offer any violence to probability, to suppose that the other substances, and amongst them the gold, which

which has also been found by washing, may have been detached from some of the numerous intervening veins, in which no trials have hitherto been made, and hence that it will be highly proper to drive the proposed level to the north-west, with a view to further discovery.

The level, thus proposed to be driven, would not be attended with any damage to the surface of the ground; the plentiful supply of water from the stream, being at all times sufficient for the conveyance of air to any distance, would preclude the necessity of sinking any shafts from the surface, until a discovery might be made of some productive vein, in which it might be deemed proper to establish regular workings.

From the trial, which has been made at the confluence of the three streamlets where some very minute particles of gold only were found, without any of the mineral substances usually met with lower down, it should seem that the most proper place, to begin the level, would be immediately below the ford at X, near the lodge where the greatest abundance of native gold and mineral substances have been obtained; where some of the veins would soon be crossed, and where there would be plenty of room to deposit the stuff cut in driving, and, if any discovery should be made, washing floors and other conveniences might be established, without the least inconvenience to the occupiers of the land.

Should

Should the plan be approved, the level should be driven to the north-west to cross the general direction of the veins, and should be carried forward at least six feet high, and four feet wide: cast iron railways should be laid down to carry light waggons, to bring out the stuff when cut, and, as the level proceeded, wooden pipes would become necessary for the conveyance of air, by means of a fall of water.

To cross all the veins, which are seen in the Ballinvally stream, (supposing them to continue in the same range) would require a level of about six hundred fathoms in length, which in one place would be about one hundred fathoms below the surface; and the probable average cost of driving that length, railways and every thing requisite included, may perhaps be estimated at 12l. per fathom, amounting to 7200l.; and as the miners would probably cut about forty or fifty fathoms in a year, the annual expenditure may be estimated at 540l. Some expense would indeed be incurred at the outset, by the erection of a secure storehouse, and workshops for a carpenter and a blacksmith, and in providing a stock of tools for the miners use; but, as the mere driving the level would, at the commencement, perhaps not exceed five guineas per fathom, there would be very little, if any, expenditure, beyond the amount stated.

It

It is further to be observed, that the estimate of the general average cost is grounded upon the presumption, that the argillite may be found of the same quality in depth, as it is where seen, at and near the surface; should it prove harder, a proportionate increase of price must necessarily be given for driving the level, though the contingent expences would remain nearly the same; on the other hand, if soft ground was met with, there would be a consequent reduction from the price of driving.

Whilst the level was going forward, trials might be made on different parts of the mountain, where the soil is shallow, by trenching, to catch the backs of the principal veins, which might be sunk upon in the summer months, when but little incommoded by water, and their contents explored: still the most effectual trial would be that of the level, and from the number of veins, which would be crossed by driving, it would be very extraordinary indeed, if the most distant should alone prove productive. The probabilities are certainly in favor of a more early discovery, and whenever a vein, productive of gold, should be found short of the extreme distance, the saving in expence would evidently be in proportion to its distance from the outset, and the product of the discovered vein might furnish a supply for prosecuting the level, if it should be deemed proper to continue it with a
view

view to further discovery. In the foregoing statement, no mention has been made of the probable produce from the gold stream works, which until the year 1798 were worked to profit, and may yet be so again, and furnish a supply towards carrying on the proposed trial; and it may be yet still further observed, that such an unusual number of veins running nearly parallel to each other, within such a trifling distance as six hundred fathoms, in a known mineral country, where various detached mineral substances have been already discovered, may reasonably be expected to contain some one or more of those substances; and even was there no vein to be found containing gold, yet, if the driving of the level should lead to the discovery of any other valuable mineral substance, and the lords of the soil, should, either themselves, or by their lessees, proceed to work the same, in that case there seems no doubt, but that his Majesty would be justly entitled to receive a certain proportion of the produce, as a compensation for the benefit derived from the level, in relieving such works from water, in the same manner as is practised in his Majesty's Hanoverian dominions, where the several mines, on lease to individuals in the Upper Hartz, pay a constant duty or acknowledgment for the use of the levels driven at his Majesty's expense, and thus the expenditure might, in process of time, be again reimbursed.

As

As the proposed undertaking, as well as the present working of the gold stream works at Croaghan, may be considered in these kingdoms as matters of novelty, and doubts may be entertained as to the propriety of prosecuting the trials, a reference to the observations, which have been made in other countries, with the opinions of the authors may probably be acceptable. I shall therefore briefly relate some of those, which have come to my knowledge.

Dons G. I. and A. De Ulloa, in their account of South America, make mention of “several
“streams, whose sands contain gold, and they
“consider the gold contained in the sands of
“such rivers, which issue from mountains, an in-
“dication of the treasures those mountains con-
“tain, though (they add) a suitable diligence
“and care have not been used for the disco-
“very of mines (1); and they shew, that in
“those provinces, where gold mines actually exist,
“the sands of the rivers in their vicinity are pro-
“ductive of gold, and washes are established
“upon them, and the mountains contain gold,
“silver, copper, lead, tin, and iron. The gold
“collected in Chili, and sent home to be coin-
“ed, amounts one year with another to 600,000
“dollars, and that sent clandestinely to 400,000
“dollars, together equal to 225,000*l.* sterling,”
(2). Of the foregoing substances, found in the mountains of South America, there are four,
namely,

namely, gold, copper, tin, and iron, found at Croaghan.

Frezier's account of South America accords with the foregoing, and he particularly mentions, "that in all the little streamlets of Chili
 " they obtain more or less gold. That the soil
 " near the surface is generally red and firm;
 " about the height of a man is intermixed with
 " coarse-grained sand, in which begins the bed of
 " gold, and that lower are the stony bottom beds
 " being a kind of *rotten rock bluish*, mixed with
 " a quantity of yellow plates, which might be
 " mistaken for gold, but are so light that the
 " water carries them off; and (he adds) that, as
 " there are gold mines above the village of Copiapo, so they also find mines of iron, copper,
 " tin, lead, loadstone, and lapis lazuli." (3).

Here again are substances similar to those of Croaghan, the blue rotten shistose rock, and the flakes of yellow mica, constantly found by washing, also iron, copper, and tin, and indeed loadstone, probably magnetic iron.

Mr. Kirwan, in the notes to his Geological essays, says, that, in Mexico, *native gold* and
 " other metals are chiefly found in secondary
 " mountains or hills (4), and admits that *argillite*
 " is frequently of secondary origin (5). That
 " at Maijos the sparry iron ore is found in secondary argillite mountains, accompanied with
 " gold, copper, pyrites, and galena. In primary
 " meval

“ meval *blue argillite*, of which the Cordelieres
 “ principally consist, occur ores of *copper, sul-*
 “ *phur, pyrites*, blende, calamine, antimonial
 “ and mercurial ores, together with those of
 “ *gold, silver, and galena*, and the sparry iron
 “ ore in *veins*” (6). Behind “ Guancovelica, the
 “ *argillite* graduates into calcareous sandstone,
 “ as does this into simple limestone, *all equally*
 “ *rich in gold, silver, and mercury.* (7.)”

That gold is procured both from veins, and stream works, in different parts of Asia and Africa is well known, but the accounts, which I have seen, do not particularly describe the nature of the rock, in which the veins are found.

In Europe, the Russian empire is foremost in the produce of gold. “ The Uralean, the Olonetz,
 “ the Kohlyvan, and the Nertschink mountains,
 “ contain mines of silver and gold. Near Eka-
 “ tarinenburg in the Ural, is the celebrated
 “ mine of Beresof, and in the vicinity, on the
 “ rivulets Pyschina, Beresof, and Uktus, are
 “ gold stream works, and from five to seven
 “ pood of gold dust may be made into bars
 “ every year (equal to 280lb.); and the whole
 “ quantity of gold, native and extracted from
 “ silver, said to be annually produced by the
 “ Russian mines, is forty pood, (8) equal to
 “ 1600 British pounds, which, at 3l. 19s. per
 “ ounce, would amount to 75,840l. sterling (8).

Hungary

Hungary has been long famous for her mines, producing gold and silver. The gold stream works in the Bannat, described by Born, (9) are situated in a country very different from that of Croaghan, but the gold stream works, near Feldwinz, on the river Maros, in the Olapian plains, are very similar. “The stratum
“of sand and pebbles two fathoms thick is superincumbent on *argillaceous slate*. To the east
“and west it is surrounded by hills, to the north
“it is adjacent to the Maros. It seems (says Born) to owe its origin to some inundation,
“perhaps even to the Maros, which descends
“from the Carpathian mountains. The gold
“cannot possibly be considered as produced in
“this plain; it is probably washed from the adjacent gold fissures, and deposited with the
“sands” (10). In his catalogue of Madame Raab’s fossils, describing native gold from Aranjós in Transylvania, he says: “It is in separate filaments or rounded grains, dispersed and spread
“abroad in the sands of rivulets and rivers,
“whither it has been transported by their waters, which have detached it from the rocks or
“veins, to which it adhered” (11); and again
“describing another specimen, he says, “this mass of native gold has, without doubt, been
“disengaged from some auriferous vein.” (12).

“The river Rhine is said to carry gold from its source in Switzerland, as far as the Dort in Holland.

Holland. M. Dietrich cites "the opinions of those, who consider that the gold is derived from the adjacent lands, but also mentions that of M. Schofler, who imagines that the gold is brought down from the Alps" (13).

(I have specimens of the auriferous sand from the Rhine, and from the Iller: the former contains fragments of tin, chrystals, wolfram, garnets, magnetic iron ore, quartz, and mica; the latter magnetic iron ore, brown iron stone, pyrites, garnets, quartz, and mica.)

The Rhone, which also rises in the Alps, carries gold from Tournon and Valence to the sea.

"On the river Ariege, which descends from the Pyrenees, and runs through the ci devant Comté de Foix, (now Le departement de L'Ariege) are stream works 12,000 fathoms in length. The grains of gold are found separate, very rarely adhering to quartz. With the gold is also found magnetic iron ore; ascending the Ariege, there are rocks of magnetic iron ore in its banks. M. Dietrich, who gives this account, recites the opinion of Mr. Charpentier, and others, that the gold, found in stream works, is not detached from veins;" but he concludes with saying: "This observation however ought not to take away our hopes, for, as I have found the rocks, whence the shodes of magnetic iron ore were de-
tached

“tached, it is not impossible, that those, which
“contain gold, may also be discovered.”

“Formerly the mint of Toulouse received
“200 marcs, (equal to 1600 oz.) of gold per
“year, from the Ariege, the Salut, and the
“Garonne. He mentions eight or ten other
“stream works, whence gold may be obtained
“in the Comté de Foix.”

“At Guadaramma in Spain, is a vein con-
“taining gold and ferruginous quartz, (16) and
“in Estremadura, and Gallicia, gold is found
“in the sands of the rivers.” (17).

“In Piedmont, all that extent of mountains,
“from lake Maggiore to the river Doria, is
“chiefly composed of granite, on which are in-
“cumbent varieties of *argillite*, and *the auri-*
“*ferous veins stretch through these mountains*
“(18); and in the most tranquil curves of the
“rivers Tefin, Cerf, Doria, Baltee, the Orco,
“and the Malin, the peasants have always been
“accustomed to gather gold (19). The moun-
“tains, which border upon the upper vallies of
“Bormida, Garis, Erro, Orba, and Scrivia, are
“primitive; thence it is not surprising, that
“gold is found dispersed in the rivers, which
“run through these vallies, and that, wherever
“the peasants work, they meet with sand, which
“is attracted by the magnet. (20).

“In the granitic, shistose, quartzose, and
“serpentine mountains of the upper Novarais,
“and

“ and in the adjacent vallies, veins of gold in
“ marcasites and quartz are found, and ac-
“ tually worked ; but more particularly in the
“ mountains of Macugnaga, seven or eight veins
“ are worked, and yield native gold in yellow
“ marcasites, in quartz, in shist, and in ochre ;
“ and on the other side of the mountains of
“ Macugnaga, are the gold mines of St. Marie,
“ and Cava Vecchia, on the same vein which, in
“ 1758, produced more than 160 marcs, equal
“ to 1280 ounces of gold, and three marcs,
“ equal to twenty-four ounces, of silver (21).
“ Above Emareze, is the celebrated plain,
“ where, in 1741, pieces of pure gold were
“ found, which weighed more than forty marcs,
“ equal to 320 ounces, and were twenty-two
“ carats fine (22) ; and at the Pison de Arles,
“ below the steep face of the rock, at the foot
“ of the cascade, amidst the heaps of rubbish
“ there have been found, in the red earth, pieces
“ of gold, of several ounces weight. This face
“ of the rock shews large veins of quartz, with
“ marcasites and red earth, from whence these
“ fragments came, and is a spot (says the
“ author) which deserves to be carefully ex-
“ amined.” (23)

The foregoing instances seem to evince, that
where native gold is found detached in rivers,
in the vicinity of mountains, composed of ar-
gillite or shistus, including veins of quartz,
and

and ferruginous ores, veins containing gold also may be sought for with the greatest probability of success; and to shew more directly the similitude, which subsists between Croaghan and some other mountains, known to contain gold, I have annexed a table of the substances, of which they are composed, and submitting the whole to your superior decision, I am (for Tho. King, Tho. Weaver, and self)

With great respect,

Sir,

Your most obedient,

and most humble Servant.

(Signed)

A. MILLS.

LONDON,

March 8, 1802.

No. 3, Spring-Gardens.

To the Rt. Hon. W. WICKHAM,

NOTE, *on the foregoing Report, by*
GENERAL VALLANCEY.

IN a former volume we shewed, that gold is mentioned to have been the produce of Ireland, in the most remote period of the history of this island.

It is a curious circumstance, that at a time, when the treasures of England and Ireland were drained to support the Court of Normandy, silver only was sent from England, and that silver and gold were sent from Ireland, as appears by the following extract from a Memoir on the History of Caen in Normandy, written by M. Delarue, and announced in the *Magazin Encyclopedique*; No. 6, Thermidor, an. x. tom. 2. (8 an.).

“The Exchequer (of Caen) acquired very great consequence and extent, when our Dukes became masters of Anjou, Poitou, and Aquitaine. The city of Caen was then the seat of the government, not only of those provinces, but also of Great Britain. The Exchequer of England was annually exhausted to fill the coffers of that of Caen, and, according to the registers kept in the Tower at London, we find that the treasury of Caen received, in one year, 23,730 marcs of silver, sent by the treasury of London, besides 400 marcs of silver, and 200 ounces of *gold sent by that of Ireland*; an enormous sum of money for those times.”

REFERENCES.

1. Ulloa's Voyages to South America, vol. 1. p. 455. vol. 2. p. 259.
2. ditto. vol. 2. p. 153. 159. 272.
3. Frezier's Voy. a la Mer du Sud, from Jars' Voy. Min. tom. 2. f. 96. 257.
4. Kirwan's Geological Essays, - - - p. 500
5. Ditto, - - - - - p. 241
6. Ditto, - - - - - p. 501
7. Ditto, - - - - - p. 502
8. Tooke's View of the Russian Empire, vol. 1. p. 99. 172. vol. 2. p. 534. vol. 3. p. 412. 415.
9. Born's Travels in Hungary, - - - p. 77
10. Ditto, - - - - - p. 136
11. Born's Cat. of Mad. Raab's Fossils, tom. 2. f. 450.
12. Ditto, - - - - - tom. 2. f. 455
13. Dietrich, Gites des Minerais, tom. 2. f. 261
14. Les anciens mineralogistes de France, tom. 2. f. 657.
15. Dietrich, Gites des Minerais, tom. 1. f. 1 & 32
16. Bowles' Nat. History of Spain, - - p. 23
17. Dillon's Travels in Spain, - - - p. 275
18. Journal des Mines, No. 50. Brumaire, An. 7. f. 87
19. Ditto, - - - - - f. 91
20. Ditto, - - - - - f. 92
21. Ditto, - - - - - f. 101
22. Ditto, - - - - - } f. 149
23. Ditto, - - - - - }

A LETTER

FROM

JOHN TEMPLETON, ESQ.



DEAR SIR,

I TAKE the earliest opportunity of transmitting to you a copy of my questions, relating to natural and civil history, and husbandry, and hope they may be of some use in bringing to our knowledge some of the many unknown curiosities of our country. From the little which I know of Ireland, I have every reason to think that, were we better acquainted with it, we would not find it behind any other portion of the earth in the number of its natural curiosities; in fertility, I believe few countries can be held in competition with it. A desire of knowing our country seems to be now arising, which must ultimately turn out to the advantage of the enquirer, by affording him an ample recompence, either in profit, or pleasure. My ardent wishes are, that you may enjoy the pleasure of seeing this plant, which you have nurtured
with

with so much care and honor to yourself, produce its goodly fruits.

I remain, Sir,

Your obliged humble Servant,

JOHN TEMPLETON:

Oak-Grove, BELFAST,
JULY 26, 1802.

TO GEN. VALLANCEY, V. P.
of the DUBLIN SOCIETY.

QUESTIONS

QUESTIONS RELATING
TO
NATURAL, AND CIVIL HISTORY, &c.

BY
JOHN TEMPLETON, ESQ. A. L. S.



SECT. I.

Geography, &c.

1. WHAT is the name, the origin, or derivation, of the name of the county or district?

2. What is the latitude, longitude, superficial contents, and boundaries?

3. If mountainous or hilly, what kinds of stone, &c., compose the mountains or hills, and at what height do the different strata appear?

4. What kinds of soil compose the lowlands, as clay, sand, &c., and of what thickness are the different strata?

5. If

5. If there are any mines, of what kind, and what are the appearances in the superincumbent strata, which indicate the mine underneath?

SECT. II.

Natural Products.

6. What are the wild quadrupeds; what time do they breed; how long do they go with young; how many young have they; do males or females appear to be most numerous; and what peculiarities of instinct and manner have you observed?

7. What birds have you observed; at what time, and in what situation do they make their nests, and lay; how long do they hatch; how many young do they rear; are the young fed in the nest, or do they follow their mother; if they migrate, at what time do they go and return; do they observe particular days of the year, for their coming and going; or if they are guided by the backwardness or forwardness of the season, what plants are budding or flowering at their appearance or disappearance; what peculiar manners or instincts have you remarked; and are there any birds, that visit the country during uncommon seasons?

8. What

8. What fishes are there found on your coast, or in your rivers ; if they remain with you, at what time, and where do they spawn ; what places do they particularly haunt, or migrate to at particular times ; at what time do they commence their migrations ; do they appear or disappear on particular days ; if they are guided by the backwardness or forwardness of the season, what plants are budding or flowering at the time of their appearance or disappearance ; and is their coming and going indicated by any other fish, or insect ?

9. What insects, or shell fish-have you observed ; at what time do they breed ; how long do they appear, and when ; what useful or injurious properties have they ?

10. What plants and trees have you observed ; in what places are they found ; what is their duration, annual, biennial, &c. ; what time do they flower ; and what peculiar properties, either useful or injurious, have any of them been found to possess ?

SECT. III.

Meteorology.

11. What is the state of the barometer, during each day, month, mean annual height, and greatest variations ?

12. What

12. What is the state of the thermometer during each day, at 7 A. M. 3 P. M. and 9 P. M. each month, and the mean annual temperature?

13. What are the prevailing winds*; and which are dry, rainy, showery, cold, warm, moderate, or violent?

14. How many inches of rain fall annually?

15. In what direction does thunder generally arrive; in what direction does it usually cease; and what conclusions can be drawn, of what sort of weather may be expected to follow?

16. What winds produce the highest tides; are the night tides invariably higher than the day tides; at what hour, after the full and change of the moon, is it full sea; and on what day after full and change is the highest tide?

17. Has the sea advanced on, or retired from your coast?

18. Has

* Does the easterly wind fall off at sun-set, and rise regularly at sun-rise? As I have never had an opportunity of observing this effect, but where the sea was at a small distance eastward, I think it worth enquiry, whether the same has been observed inland, or on the western coast.

18. Has the climate experienced any known changes, and at what period?

SECT. IV.

Agriculture.

19. What is the quantity of cultivated ground; what is the average quantity under each particular crop; and has any been lately reclaimed?

20. Which are the best cultivated, large or small farms; and which bring most produce to market, of proportional extent?

21. What is the nature of the tenures; and what particular clauses in the leases are reckoned peculiarly vexatious?

22. In what manner are the fields enclosed, and are they ever held in *Rundale*?

23. How many acres is a man supposed to be equal to the cultivation of; for instance, how many persons are required to cultivate ten, twenty, thirty, &c. acres of arable?

24. What kind of ploughs are used; how many horses or oxen yoked; how much do you plough in a given time, with two or four oxen or horses, and to what depth?

25. To

25. To which do you give the preference, horses, or oxen?

26. What is the rotation of crops; how many years in succession is the ground under each crop; and how many years is it afterwards grazed?

27. What quantity of ground is supposed equal to the grazing of a horse, cow, or sheep?

28. What kinds of grain are cultivated; and what varieties are found to answer best the soil and climate?

29. What kind of potatoe is reckoned the best; if the curl is known, what has been found the best preventive?

30. What kind of manure is principally used; in what quantity does it answer best; and how long are its effects visible?

31. Has watering meadows been practised; in what manner, time, and with what effect?

32. If any plantations are made, what particular trees thrive best on the soil; what kinds thrive best in those places most exposed to high winds, or to the sea air; and to what purposes are the different kinds of timber best suited?

33. What

33. What kind of domestic animals thrive best on the land ; what are the best methods of rearing and feeding them, and curing their diseases; what diseases are most common, most dangerous, or peculiar to any district ; and have any efficacious remedies been found for them ?

34. If bees are reared, what are the surest indications of an inclination to swarm ; has the honey been taken without destroying the bees ; what is the best method of getting them into a new hive ; what time is the best, and latest to take the honey ; and what is the best method of preserving them through the winter ?

35. What are the weights, and measures ?

36. What is the price of necessaries, compared with that of wages ?

37. What are the tythable articles ; if the tythes are paid in money, what is the rate per acre, and are they leased to the farmer ?

38. Have the farmers', or labourers' families any profitable employment, which they practise in the evenings, or on wet days ?

SECT.

SECT. V.

Arts, &c.

39. If there are any mines, how long, and in what manner are they wrought?

40. What are the arts most practised; and what arts or manufactures could be introduced with most propriety and advantage?

41. What are the articles imported and exported; balance of trade, and amount of customs and excise?

SECT. VI.

Government.

42. What are the cesses, their amount, and how are they laid on?

43. Are there many lawfuits; what is the principal cause of contention; and have the petty or special sessions, and court leets, any beneficial effects?

44. What are the religious, charitable, or literary establishments, such as common schools, charter schools, or subscription libraries; how are

these establishments regulated, and supported ;
and what is the moral or social effect ?

SECT. VII.

Political State.

45. What is the number of births, males and females, marriages, and deaths ?

46. What is the total mass of population ; is it encreasing, or decreasing ; and what is the course of its encrease or decrease ?

47. What are the characteristic moral qualities, as honest or dishonest, peaceable or quarrelsome, lively or phlegmatic, &c. ?

SECT. VIII.

Historical.

48. If any ancient castles, towers, or other civil or religious monuments remain, what is known of their establishment, regulations, and destruction ?

49. What historical or biographical accounts have you of any remarkable families, or persons of your district ?

50. Is

50. Is there any appearance, which seems to indicate, that the country was more populous formerly, than at present, or its having been cultivated in antient times, where there is no cultivation at present?

A LETTER

FROM

JOHN POLLOCK, ESQ.

MOUNTAINTOWN, NAVAN,
JANUARY 2d, 1803.

DEAR SIR,

PERHAPS the following communication may be thought worth promulgating by the Society.

I have bred some very fine heifers, of the long horned *Leicestershire* breed. One of them lately was seized with a complaint in the throat, attended with a difficulty of breathing, and an apparent difficulty in swallowing, both which symptoms encreased, notwithstanding the applications and exertions of all the experienced herds and people near me, who had the reputation of skill in curing those disorders, to which cows are liable; in a few days the heifer refused to take any food, and, being considered as incurable, she was killed. I had her throat opened, and found

found that an excrescence of flesh, or polypus, had grown somewhat below the root of the tongue, to the size and nearly of the shape of a kidney, save that it had plainly a neck or root, from which it grew, and that this polypus had nearly covered both the throat and windpipe of the animal; and further, that the excrescence was in a general state of putrefaction. I lamented a good deal the loss of the heifer, but in a few days after I was much concerned to observe, that another of my stock, of the same breed and age, (now rising four years old) discovered exactly the same symptoms, and progressively grew worse, being scarcely able to breathe, and refusing all kind of food. I had heard of a surgical operation, in cutting out a polypus from the human nose: I at length determined to try the experiment on my heifer; for that purpose I threw the animal down by ropes, and having tied her legs, and got sufficient assistance to keep down her head, I opened, under the insertion of the jaw bone, a passage by the side of the windpipe compleatly into her throat, (taking great care to avoid the great veins and arteries in the side of the neck) sufficiently large to admit a man's hand. I then made my steward put his hand into the wound, and take hold of the polypus, and pull it with some force out of the wound, so

I

that

that the neck of it was visible. I then cut off the polypus, sewed up the wound, leaving however a seton in it, and untied the heifer; for the remainder of the day she refused both food and drink; the next morning I had her turned for a few hours to grass, which she began to eat, and from the inclination of her head and neck, whilst eating, a most considerable discharge of suppurated matter came from her nostrils. She however daily recovered; the suppuration from her nostrils soon disappeared, but the discharge from the wound in the neck continued in a considerable degree, by reason of the seton I had put into it, and which I further encouraged by the application of warm stupings twice a day. The animal in the course of one week, from the time of the operation, recovered perfectly, and is now as well as ever she was.

I am, Dear Sir,

Your most obedient servant,

JOHN POLLOCK.

REV. DR. LYSTER, &c. &c.

A LETTER FROM
JOSEPH COOPER WALKER, ESQ.

TO
GENERAL VALLANCEY,
ON PROMOTING THE ART OF PAINTING
IN IRELAND.



DEAR SIR,

IN the year 1790, I was invited by an active member of the Dublin Society to visit the Drawing Academy. Recollecting, that that academy had produced a Barret, a Shee, and a Nugent, each of whom have reached great excellence in their respective departments, and a Hamilton, who may be termed the *Irish Reynolds*, I will confess my expectations were raised very high, but alas! they were sadly disappointed. I was conducted through a gallery ill lighted, ill furnished, and unadorned with a single busto, or picture of merit, to the model room; here I found a few mutilated casts huddled together; from this circumstance, and from its being damp and gloomy, I thought the room had more
the

the appearance of a sepulchre or charnel house, than of an apartment appropriated to the study of one of the most useful and most elegant of the fine arts. I proceeded no farther; but though I lamented, I was not at liberty to enquire into the cause of this apparent neglect. It could not, I was confident, be supposed that such an institution was unnecessary in a rising commercial country; there was no member of the Society, I was sure, who could be ignorant of, or insensible to the justness of the following observation of Sir Matthew Decker. "A public drawing-school, says he, will encrease our trade by improving the genius of the people; for as a workman, who has been bred a good draughtsman, will be more ingenious in a business, that requires skill in drawing, than one ignorant of it, so his work being better designed will improve the ingenuity of his apprentices, who won't bear to see an ill fancied piece of work; consequently a succession of skilful artists will be raised, which is of infinite benefit to a trading nation; for unless the workmanship of goods be well fancied, and foreigners brought to think them fashionable, they won't find a quick sale; whereas now we send all our customers to our rival-shop, France, by having it publicly known, that we take our fashions

fashions from thence.”* Supposing the justness of this observation to be acknowledged by every member of the Society, it occurred to me, that the cause of the decay of the school, or academy, must originate in the want of an adequate fund for its support ; or, perhaps, in the want of a proper plan. Impressed with the latter idea, I sat down, on my return home, and sketched *Outlines of a plan for promoting the art of painting in Ireland : with a list of subjects for painters, drawn from the romantic and genuine histories of Ireland.* This little piece was printed, and a few copies got abroad ; but as the pamphlet is become scarce, I shall beg leave to trouble you with a few extracts from it, chiefly with a view to shew, that I am not indifferent to the promotion of an elegant and an important art, in my own country, or inattentive to the objects of a Society, to which I have now the honor to belong. Since I sketched the plan, which I am submitting to your consideration, I have visited several academies of painting in France and Italy ; in some, as you may suppose, I found many rules, or regulations worthy of adoption ; but I was not induced to alter or extend my outline. You will find it in its pristine state. And if my little sketch should
be

* Essay on Foreign Trade, p. 181.

be honoured with your approbation, it may be meliorated by your wisdom, and your acknowledged theoretical and practical skill in the art, which it is intended to promote, into an useful plan for the academy, over which you so ably preside.

Believe me to be,

Dear Sir,

With great respect and esteem,

Your much obliged,

and most obt. humble Servant,

J. C. WALKER.

ST. VALERI, NEAR BRAY,

10 JANUARY, 1803.

EXTRACTS FROM
OUTLINES OF A PLAN
FOR PROMOTING THE
ART OF PAINTING
IN
IRELAND.

THE institution, which I would propose to raise on the foundation, or rather on the ruins of the present school, should originate in the further bounty of Parliament, or in the liberality of the Crown; for it would require at least 1200l. per annum to support it. The hand of parsimony would shake this visionary fabric to the centre.

In the first instance, a gallery capable of containing three hundred boys should be erected in a central situation, or on the site of the present school: for, besides such boys as may be intended for the professions of Painting or of Architecture, I propose it should be sufficiently capacious to receive all those boys apprenticed to trades, which depend on, or are connected with Design, in order that the time, which is too often spent by apprentices in the performance of menial offices in
the

the service of their masters, might here be profitably employed, and a race of accomplished artists thus given to the nation. This structure should be a proud dome, and a monument of architectural elegance; it should be a temple worthy the Graces. On its front should be chastly displayed the beauties of sculpture; and it ought to be furnished, or rather peopled, with casts of the

“——finest forms by ancient genius wrought.”

Original paintings by, or good copies after the best masters, should be also gradually procured, and suspended against the walls. So that a ray of knowledge might issue from every object, on which the student should happen to turn his eye. “The principal advantage of an academy is, (says Sir Joshua Reynolds) that, besides furnishing able men to direct the student, it will be a repository for the great examples of the art: these are the materials on which genius is to work, and without which the strongest intellects may be fruitlessly or deviously employed. By studying these authentic models, that idea of excellence, which is the result of the accumulated experience of past ages, may be at once acquired, and the tardy and obstructed progress of our predecessors may teach us a shorter and an easier way; the student receives at one glance the principles, which many artists have spent
their

their whole lives in ascertaining; and, satisfied with their effect, is spared the painful investigation, by which they come to be known and fixed*.” Soon as the young artist has by this means acquired the idea of that central form, from which every deviation is deformity, he may then venture to range abroad amongst the works of nature in quest of subjects for his pencil, or seek them amidst the annals of Irish valour or Irish patriotism.

To this gallery should be annexed a library supplied with the best historians both ancient and modern, and an extensive collection of those authors, whose works are calculated to refine the taste or enrich the fancy. Here the student of a certain standing should be permitted to read occasionally: “For a painter (says Algarotti) should be neither illiterate, nor unprovided with books†;” and we are told by Pliny the elder, that it was the opinion of Pamphilius, a celebrated painter of antiquity, that a painter, who aspired after excellence in his art, should cultivate every species of polite literature.—In this room too, the student should find a collection of Engravings

* *Discourses* vol. i. pag. 9.

† “Il pittore non ha da essere sfornito di certe cognizioni, né sprovvisto al tutto di libri.” *Opere* del Conte Algarotti, tom. ii. pag. 203.

gravings from the designs of all the great masters of the different schools, in order that he might be able to trace the progress and history of his art, and make himself acquainted with the various styles of painting, which have been, and now are most prevalent. This room should owe its decorations to the pencils of the students or of the masters, whose choice of subjects ought to be confined to Irish history or Irish romance.

——“ nobly partial to our native earth,
“ Bid *Irish* pencils honour *Irish* worth *.”!

Thus would the academy not only be the nursery of infant genius, but be regarded as a school of public virtue.

Des yeux qu'il a séduits l'Art passe jusqu'à l'ame,
Des passions qu'il peint il y verse la flamme†.

I would recommend, that the academy should be placed under the government of a committee, consisting of at least ten members of the Dublin Society; and be divided into three departments.

In the first department **FIGURE DRAWING** in its various branches should be taught. The master at the head of this department should be

* The last line of this quotation is altered from Mr. Hayley's admirable *Epistle to an eminent painter*.

† *La Peinture*, Chant. iii.

be aided by a professor of anatomy. "To ask if the study of anatomy (says Algarotti) is requisite to a painter, is the same thing as to ask if, in order to learn any science, a man must first make himself acquainted with the principles of it. A man who is not acquainted with the form and construction of the several bones, which support and govern the human frame, and does not know in what manner the muscles moving these bones are fixed to them, can make nothing of what appears of them through the integuments, with which they are covered, and which appearance is, however, the noblest object of the pencil: it is impossible for a painter to copy faithfully what he sees, unless he thoroughly understands it*." To a knowledge of Anatomy must be added that of Perspective. "The study of Perspective (observes the same elegant writer) "should go hand in hand with that of Anatomy, as not less fundamental and necessary."

* "Disputare se lo studio della Notomia è al pittore necessario sì o no, è tutt' uno che domandare, se per apprendere una scienza sia necessario farsi da' principj di quella: ed egli è opera perduta andare infitzando, a confermazione di tal verità, le autorità degli antichi maestri, e delle più celebri scuole. Colui che non sa, come sieno fatte le ossa che reggono il corpo umano, come vi sieno sopra appiccati i muscoli che lo fan muovere, nulla può intendere di quello che a traverso gl' integumenti che lo ricuoprono ne apparisce al di fuori; ed è il più nobile obbietto della pittura. Non intendendo quello che un vede, non potrà mai fedelmente ricopiarlo." *Opere del Conte Algarotti, tom. ii. pag. 109.*

cessary*." Designing, Colouring, and Drapery, are next to be studied. This, though the first, is perhaps the most important department, and should not be passed through rapidly.

The second department should be devoted to LANDSCAPE and ORNAMENTAL DRAWING. To study with success in this department, the young artist must above all things study nature; but to study her with effect, he should be taught to discriminate and appreciate her beauties, so happily combined and displayed in the works of Lorenzetti, Pouffin, Bartolomeo, Titian, Claude, Smith, Gainsborough, and Wright; nor should the works of J. Baptist Monoyer, and other celebrated painters of fruit and flowers be forgotten. Thus may the student learn to fix the seasons, and render stationary the circling year. But to reach excellence in this department, he must pass for a while to the next, or

The third department, which I would have appropriated to ARCHITECTURE; without a knowledge of which the painter must be deficient in one of the greatest requisites of his art; namely, a knowledge of Costume, by means of which only he can express with true precision

* "Allo studio della Notomia fa di necessità aggiugnere fino dal bel principio quello della Prospettiva, come nulla meno fondamentale, e necessario." *Ibid.* pag. 123.

precision the time and place, in which his scenes are laid. The third department, therefore, should not be neglected by those whose object is the second, nor the first and second by those whose object is the third; for an architect should be skilled in every branch of drawing.

In those several departments, Lectures ought to be occasionally read, and the notice of the student directed to the works of the most approved writers or painters, who have treated of their respective subjects. And the masters should be enjoined to report, with impartiality, to the visitors, the names of those boys, in whom they may discover latent sparks of genius ready to blaze forth at the animating touch of encouragement. From such boys, Two should be selected every second year; and if the consent of the parents could be obtained, they ought to become the adopted children of the academy. Soon as they had completed a classical course of reading, acquired some knowledge of the modern languages, and devoted a certain portion of time to each department of the Drawing-School, they should be sent to complete their studies in Italy with an annual allowance of at least 80*l.* each, during the term of three years. And in order to induce those "travell'd artists" to return to their native shore,
and

and diffuse or cherish a taste for the fine arts through this kingdom, it is to be hoped that the directors of the several public buildings, now raising in Dublin, would solicit the pencil to afford its aid in decorating them with portraits of Irish worthies, or historical paintings of memorable events. Nor would, I trust, the art of painting want friends in private individuals of wealth and consequence.

And as a further excitement to the exertion of genius, the annual exhibitions of paintings should be revived, and part of the receipts for admission be distributed, as formerly, in premiums. Thus would bashful merit be introduced to the notice of the public, and a wreath of unfading laurels be placed on her brow. In those exhibitions I would recommend the giving particular encouragement to history painting, not only for the reasons already assigned, but because it is, as Mr. Barry sensibly observes, "one of the tests, by which the national character will be tried in after ages.*"

But, perhaps, the most effectual method of promoting the art of painting, and of restoring its genuine lustre, would be, by calling in its fascinating powers to the aid of devotion.

* *An enquiry into the obstructions to the acquisition of the Arts in England*, p. 132.

tion. "Painting (says the elegant Walpole) must have ampler fields to range in than private apartments* ;" and amongst our religious edifices it might range without controul. Let us then endeavour to heal the deep wound, which this art received through the sides of the Romish religion. In order to this we should conceal the glare of the whitened walls of our gay churches with lively representations of the great events in the Old Testament, in the Acts of the Apostles, and in the life of the meek and lowly Jesus. Surely the most frigid Christian could not look with indifference on the fall of Adam, the contrition of Cain, the Mosáical laws issuing in thunder from Mount Sinai, or the heaven-directed hand inscribing the fate of the Assyrian monarch on the wall ! Nor could he behold without emotion Judas betraying his master, or Paul enlightened by a ray from Heaven ; Christ healing the sick or raising the dead,—enduring agonies in the garden, or yielding up the ghost on the cross!—Thus would the vagrant thoughts of the congregation, assembled in the hour of divine service, be arrested by objects, which would give a fervor to devotion, and painting be nobly employed in the service of religion.

Having

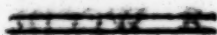
* *Anecdotes of painting in England*, vol. iv. pref.

Having thus lifted this lovely art under the banners of the church, I will here close my plan, although I fear I have omitted many things necessary for its perfection; —yet I hope I shall not be accused of vanity, when I say that, if the rude outline which I have thus hastily delineated be steadily pursued, Ireland, in a few years, will become

A SCHOOL OF PAINTING.

SUBJECTS FOR PAINTERS,

DRAWN FROM THE ROMANTIC AND GENUINE

HISTORIES OF IRELAND.

Some lofty theme let judgment first supply,
 Supremely fraught with grace and majesty :
 For Fancy copious, free to ev'ry charm
 That lines can circumscribe or colours warm,
 Still happier if that artful theme dispense
 A poignant moral and instructive sense.

FRESNOY, translated by MASON.

ST. PATRICK encompassed with Druids,
 Bards, and Chieftains, explaining the nature
 of the Trinity by means of the shamrock. A
 Druidical temple overthrown, at some dis-
 tance. The sun rising.

The death of Conloch. Conloch feebly rais-
 ing himself to disclose the secret of his birth
 to his father, who kneels to assist him. Blood
 streaming from Conloch's wounds between
 Cuchullin's feet. A camp and a group of
 warriors in the back ground.

K

" Approach

“ Approach ! ”—the wounded youth reply’d—

“ Yet—yet more closely nigh !

“ On this dear earth,—by that dear side,

“ O let me die !

“ Thy hand, my father!—hapless Chief !

“ And you, ye warriors of our isle, draw near,

“ The anguish of my soul to hear,

“ For I must kill a father’s heart with grief.”

Reliq. of Irish Poetry, p. 18.

Finn discovering a weeping damsel on the borders of Lough-shieve on the summit of Slieve-Guillen. His dogs attending. As the lake is in being, the scenery might be copied after nature. *Reliq. of Irish Poetry*, pag. 97.

Moira Borb unhorsed by Osgur on the sea-shore. He should be represented as just risen—his hand on the hilt of his sword, and his eyes beaming fire. The horse should be struggling in the pangs of death, and the princess escaping. Finn and Osgur boldly advancing. *Ibid.* p. 131.

Craftine having performed Moriat’s Ode in the French court, discovering himself to Maon. This subject will not only give the painter an opportunity of expressing a great variety of passions in the countenances of the spectators, but of exhibiting the dress of an Irish Bard. *Ibid.* p. 357.

Feircheirtne

Feircheirtne precipitating himself from the rock of Rinchin-beara, with Blanaid in his arms. Concovar Mac Neffa and his court grouped at a little distance.

Hist. Mem. of Irish Bards, pag. 33.

The death of Morrogh O'Brien at the battle of Clontarf. Anrud in the agonies of death, fastened with Morrogh's sword to the ground, and at the same time plunging Morrogh's own skean into his heart as he bends over him.

Collect. de Reb. Hib. vol. i. pag. 531.

King M'Murrough's descent from a hill to meet Richard II. His dress, his arms, his suite, and the scenery of the place, are so minutely described by Harris and Strutt, that the painter may religiously observe the costumè. See *Hibernica*, pag. 53. *Regal and Ecc. Antiq.* pag. 17, and *Hist. Essay on the Dress, Armour, and Weapons of the Irish*, pag. 53.

King John receiving the homage of the Irish Chieftains at Waterford. Leland's *Hist. of Ireland*, vol. i. pag. 144.

The parley between Essex and Tyrone in the county of Louth. Essex on the bank of the river, and Tyrone plunged up to the saddle in the stream. The followers of each attending. The portrait of Essex may be given. Tyrone's face in shade. Leland's *Hist. of Ireland*, vol. ii. pag. 360.

Fingall, with Sitrick the Danish general grasped in his arms, throwing himself from Sitrick's ship into the sea. Warner's *Hist. of Ireland*, pag. 390.

Earl of Desmond borne on his shield from the field of battle by the Ormondians. The painter should seize the moment when the Earl suddenly raises his head to reply to the taunting question of his supporters:—"Where is now the great lord of Desmond?" Leland's *Hist. of Ireland*, vol. ii. pag. 238. The Earl's face should appear pale from the loss of blood, and indignation should seem flashing from his eyes.

The death of Duke Schomberg at the battle of the Boyne. A distant view of the church of Donore.

The venerable O'Connor meditating over the grave of Carolan in the church-yard of Kilronan. Part of the church appearing, with the skull of Carolan in a niche. *Hist. Mem. of Irish Bards*. Append. pag. 96. Mr. O'Connor might be a portrait.

The wife of Carolan encircled with her children at play, anxiously waiting the return of her husband. *Ibid.* pag. 88. This subject is not suggested as being either interesting or very picturesque, but merely to give the painter an opportunity of representing

ing the dress of a female peasant, which he may find described with fidelity and anxious exactness in the dress of Mary Morgan. See *Hist. Essay on the Dress, Armour, and Weapons of the ancient Irish*, pag. 73.

A short account of the origin and progress of the Drawing School of the Dublin Society, until the year 1790.

WHILE the Dublin Society was yet in its infancy, and supported by private subscription, it befriended the art of Design. So early as the year 1744, this useful body employed Mr. West (father of the present ingenious painter of that name) to instruct twelve boys in drawing, at his house in George's-lane. Soon after, taking a house in Shaw's-court, Dame-street, they built a school-room for Mr. West: to this room he removed his pupils. In 1753, Mr. Mannin came to Ireland, and was immediately engaged by the Society to instruct eight boys in ornamental and landscape drawing. This number was soon increased to twelve. Previous to this, the Society was incorporated, and their funds augmented by the bounty of parliament. Annual salaries were now settled on Messrs. West and Mannin, and apartments given them in the Society's house in Shaw's-court; and they engaged, on their part,

part, to receive as many pupils as the Society should recommend. And Mannin, in consideration of a further allowance, agreed to open a school for the instruction of girls in his department of ornamental drawing. On the removal of the Society to the house in *Grafton-street*, the school for girls was discontinued, and the masters no longer allowed the benefit of apartments; but their salaries were continued, and they were appointed to preside over a school, which the Society opened in a building adjoining their house. To the professors of figure and ornamental drawing was now added a professor of architecture. And out of the annual grant of 5000*l.* to the Dublin Society, the sum of 300*l.* per annum was appropriated to the support of this School.

NOTE

BY A MEMBER.

Long since the period mentioned by Mr. Walker, a committee of the members were appointed to inspect the schools, and several excellent draughtsmen, in each branch, have been produced to the world. There are now about 150 boys in the three schools, which are very conveniently laid out at the Society's house in *Hawkins'-street*. A number of excellent casts and busts have been purchased, and some good paintings also. There are annual exhibitions; and premiums are offered for the best performances in each branch.

A LETTER

A LETTER
FROM THE
REV. DEAN DIGBY,
ON THE
CULTURE AND SAVING
OF THE
SEED OF RED CLOVER.

GEASHILL,
FEBRUARY 15, 1803.

SIR,

I REQUEST you will lay before the Dublin Society the following observations, respecting the culture and saving of the *seed of red clover*. This attempt has, I apprehend, been seldom crowned with success in this country, and yet few crops prove more productive.

In April 1800 I sowed red clover seed over a field of five and a half acres, on which bere and wheat had been sown in October before; with which crops I laid down the field. In the beginning of June 1801 I mowed the
first

first crop for hay, just as the field was getting into flower, had it made up, and drawn home by midsummer.

About the 10th of October, I mowed the second crop for seed. This was not, until the flowers were all perfectly dry and withered, and the field as brown as a heathy bog, the stalks also turning brown; these marked the seed to have been perfectly *matured*. In this process, all idea of getting hay from that crop was given up: I made this seed-crop into a rick, thatched it well, and let it stand so all winter.

I began in April 1802 to thresh, with common flails, in my barn, the clover occasionally, as I wanted either to sow, or to sell the seed, in an *unwinnowed* state, just as hay-seeds are usually sown, and as it came from the flail on the first threshing.

I attempted, by repeated efforts of threshing and winnowing the clover, in this stage of the business to get some seed clean, but all in vain. I therefore sowed in April 1802 my fields with the clover in this unwinnowed state, just as hay-seeds are sown; and finding it a very promising crop, the farmers, and others in my neighbourhood, were induced to buy from me a considerable quantity of this uncleaned seed, and sowed it; and the return has proved to the full as
great,

great, as crops sown with the English *cleaned* seed.

In the months of June, July, and August, after the sowing-season was over, I renewed my attempts to clean and make merchantable the seed, and effectually accomplished it, although the season of last summer was much against me.

After the first threshing, and getting the pods and seeds, and chaff, from the stalks, with common flails, I spread it on winnow sheets to dry, when favourable weather offered: and I found that it required two or three complete dry, warm days, before the seed could be effectually gotten out and cleaned. When the weather proved thus favourable, I threshed and winnowed with a winnowing machine immediately after it was gotten so dry, as to feel crisp under the hand, and so, that the flails reduced to dust the chaff, which the winnowing machine discharged. I sifted also with sieves, of sizes adapted to the size of the grain, so that not only all the light and incomplete seeds, but the seeds of weeds or other grasses were separated from the clover, and my cleaned seed deemed as good, and has proved as productive, as any imported.

The wetness, however, of last season often obliged me to have recourse to fire-heat,
which

which process, though tedious and troublesome, still answered the purpose. And I found that, whether dried by the sun, or by fire, I could not let a single night pass without threshing and winnowing, that it might not grow damp, or lose its crispness, and so not yield its seed.

Notwithstanding this crop proved so very productive, as shall be hereafter shewn, yet still I never was able to get out all the seed; for wherever the very dust and chaff from the winnow-machine fell, a profuse crop of young clover plants appeared in ten, or twelve days. This proving to be the case on almost every occasion, I gathered the dust, chaff &c. up, and sowed them on spots in my cut-away-bog, and they grew there.

I have two objects in view in communicating these matters to the public, through the Dublin Society.

1st, To induce gentlemen resident in the country to adopt, and improve upon, the culture here recommended, and which to me has proved so productive as will herein after appear. They probably will not often have so wet a season to encounter, as last summer.

Let the first crop, whether ripe or not, be cut early. Let the second or seed crop be left standing until thoroughly ripe, and there will be very little trouble, or expence,
in

in sufficiently making and saving it, and no danger whatever of its shedding its seed. It will dry very speedily, even at so late a season, and, if well thatched, will further ripen and mature when made up.

2d. My second object is, to let the farmer, who cannot afford the risk of experiment, see that he can, without any difficulty, expence, or hazard, save clover seed for his own use, and for sale in the circle of his neighbourhood; seed, which will grow as well, and produce as plentiful a crop, as the best English seed he can buy.

I shall now state to you the return I have had from the five and a half acres of clover.

Before I had been able to clean the seed, and doubtful what quantity of seed might be contained in a barrel, in its *uncleaned* state, I sowed sixteen acres with uncleaned seed, and allowed to each acre five herring-gauge barrels. I also sold ninety-six such barrels at 4s. 4d. per barrel. I weighed the barrel, and it weighed about twenty-three pounds. When I had accomplished the mode of cleaning, I got from each barrel never less than seven, often more than eight pounds, so that I not only sowed my own grounds much thicker than usual, or was necessary, but also sold the seed at about half price, viz. 8s. 8d. the stone.

I furthe

I further sowed last October, immediately after having sown wheat in the field, seven acres with the *uncleaned* feed, one acre also adjoining thereto with *clean* feed, and bush-harrowed the field. I shall sow (of the same field prepared for oats) seven acres more this spring with *clean* feed, and shall thereby have an opportunity of seeing, whether *that* sown last winter, or *this* in spring, answers best, and whether the cleaned or the uncleaned feed is most productive. Probably the former will be more free from weeds.

The return from five and a half acres was thus.

	£.	s.	d.
I value the first crop of hay at 3l.			
10s. per acre.	19	5	
Sold 96 barrels at 4s. 4d.	20	16	
Sowed 80 barrels at ditto.	17	6	8
Cleaned effectually $8\frac{1}{4}$ cwt. and sold it at five guineas per cwt.	46	18	5
Total produce.	£.104	6	1

I saved also, and kept separate all the light and bad seed, and shall sow the same next spring.

spring. I intend to make a further report next season ; upon this last I have made no estimate.

N. B. Mice are as fond of this feed, as of corn.

I am, Sir,

Your most obedient,

Humble servant,

W. DIGBY.

TO THE REV. DR. LYSTER,
SECRETARY TO THE
DUBLIN SOCIETY.

A LETTER
FROM
CLEMENT ARCHER, ESQ.
TO
GENERAL VALLANCEY
ON SOME BREEDS OF SHEEP.

BATH, JAN. 12, 1803.

DEAR GENERAL,

I HAVE been favoured with your letter, and have the honor to enclose an Essay on the practicability of producing clothing wool in the British Isles, written by my very ingenious and public spirited friend, Doctor Parry, of this place, for the perusal of your members. The subject is, I think, worthy of the consideration of the Dublin Society; for the attention of the Irish breeder and grazier of sheep has, I believe it cannot be denied, been turned almost exclusively to a breed of sheep (the Leicester), which are neither as profitable to the farmer, as pleasant to the lover of mutton, or as advantageous to the woollen manufacture of the British Islands, as some other kinds

kinds of sheep are now found to be in this country.

The Leicester sheep are now nothing near so high in the estimation of the English breeder, butcher, or consumer of mutton, as they were some years ago, for the following reasons.

1st, The wool of this variety of the animal is found to grow so long, and to possess so little elasticity, when it is at its greatest length, that it separates upon the neck and back of the creature, by which the skin is exposed more to rain and cold, than is the case with sheep, whose wool is shorter, closer, more elastic, and of a finer staple.

2d, The Leicester sheep are uniformly known to have too great a quantity of fat, in proportion to the lean; there is therefore less *eatable* part in a given weight of this, than of any other kind of mutton; hence they are not so advantageous for family use.

3d, The Leicester sheep are never found to contain as much inside fat as other kinds; hence they are not so profitable to the butcher.

In what then are they superior to other kinds? In beauty; disposition to become fat at an earlier period of their lives, and consequently of being sooner fit for the market; in having less offal in proportion to their weight;

weight; and lastly in being less disposed to ramble, and therefore more easily restrained within the bounds of their pasture: but are not these good qualities more than counterbalanced by the coarseness of the wool, the waste occasioned by their want of a due proportion of fat and lean, and by the deficiency of caul and kidney fat?

And will not the advantage, which accrues to the farmer from their being good mutton, and consequently saleable at, let us say, a year old, be amply compensated for by a breed of sheep, the fleeces of which will produce annually five or six shillings a piece more, than those of the sheep in question?

These considerations have induced a great many of the most experienced and best informed farmers in this kingdom, to reject the Leicester breed, and to adopt other kinds. Those, who breed and feed for the butcher, find that a cross between the Lincoln, Cotswold, Dorsetshire, or Wiltshire kinds and the Leicester, are much better mutton than either of the parent kinds (see Young's Statistical Account of Lincoln); and such as turn their thoughts to the growth of wool, for the manufacture of superfine and refine cloth, find their account in having a flock crossed in the following way.

1. Cross

1st, Cross ; a Spanish ram on ewes of either the South Down, or Ryeland short-wooled breed.

2d, Cross ; a Spanish ram, or, what answers as well, a ram descended from Spanish parents, but bred in England, upon the produce of this cross.

3d, The same ; when the wool is found to have arrived at its *ne plus ultra* of fineness, and is to the full as fit for superfine broad cloth, as any that is imported from Spain.

These sheep, it must be confessed, are not well shaped, but they are remarkably less subject to the most common diseases of the animal, viz. the rot, the foot rot, the gid, red water, and scab, than any of the kinds we were before acquainted with ; they are easily restrained, and will live, thrive, nay grow fat upon poor, light ground, under six shillings an acre in value, on which a Leicester, a Cotswold, a Wiltshire, a Dorsetshire, or a Lincolnshire sheep, could never be brought to perfection. But as I have treated this subject more fully in an essay, which I have written on the natural history, and properties, of all the kinds of sheep I met with in a long tour through Ireland, Scotland, and England, last summer, and ~~which~~ I mean to send to you, as soon as I have leisure to revise
L and

and transcribe it, I will say no more of it at present, but will conclude by assuring you, that I am,

Dear Sir,

Your most obedient,
and very humble Servant,

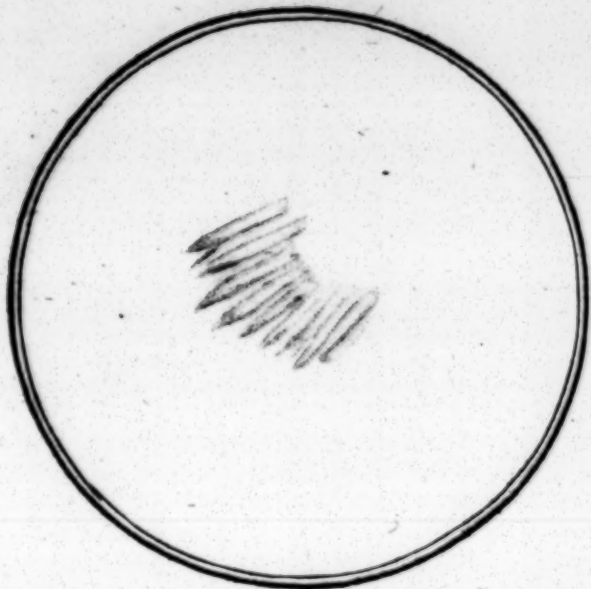
CLEMENT ARCHER.



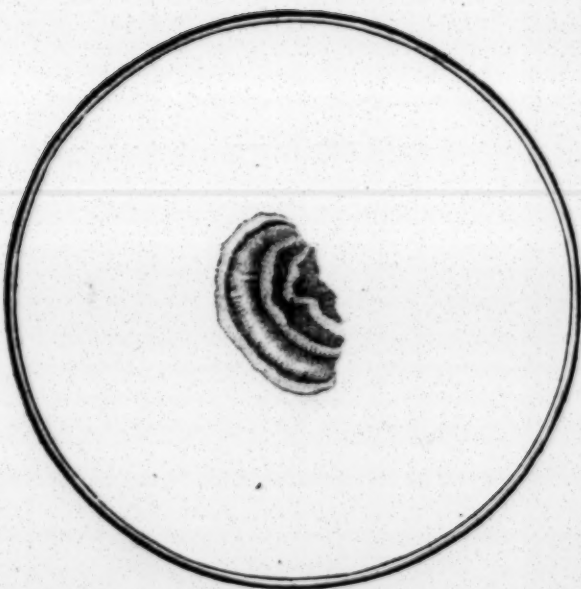
A



C



B





N^o 2.



Dicranum Scottianum.

N^o 1.



Length of the
Seta

Grimmia maritima.

MARITIME PLANTS,

OBSERVED ON THE COAST OF THE

COUNTY OF WEXFORD,

Near Fethard, in August 1802.



1. *Fucus sanguineus* ; thrown on the shore : not
common.
2. *F. dasyphyllus* ; on the shore ; scarce. II. Linn.
Trans. 229.
3. *F. siliculosus* ; not uncommon.
4. *F. teres* ; III. Linn. Trans. 140.—*F. esculentus*,
Lightfoot : scarce.
5. *F. alatus* ; on the beach, and growing on rocks ;
common.
6. *F. serratus* ; very common.
7. *F. vesiculosus* ; very common.
— — — — — var. *foliaceus*.
— — — — — var. *spiralis*, Turner ; *F. spiralis*,
III. Linn. Trans. 147. common ;
and other varieties.

8. *F. saccharinus* ; not uncommon, on the shore.
9. *F. phyllitis* ; Stackhouse, Withering : growing on rocks and on fuci ; but as it resembles young plants of the *F. saccharinus*, and as its fructifications are not known, it is a doubtful species.
10. *F. digitatus* ; common, on rocks ; the young plants resemble those of the two preceding species.
11. *F. laceratus* ; common, on the shore ; *F. laciniatus*, Withering.
12. *F. edulis* ; Stackhouse, &c. on the shore, not uncommon.
13. *F. palmatus* ; Lightfoot : *F. dulcis*, Gmelin.
Ir. Dillisc or Dulish :
Ulva palmata, Withering ; not uncommon.
14. *F. rubens* ; not uncommon ; *F. prolifer*, Lightfoot, Withering.
15. *F. pinnatifidus* ; on the shore, common.
 ————— var. *F. osmunda*. Gmelin.
16. *F. crispus* ; common.—*F. ceranoides*, Withering, Lightfoot.
 ————— var. *brunneus*. Linn. Trans. and Gmelin, VII. f. 1.—this seems to vary into Turner's variety *acutus* of the *F. mamillosus* : there is also a proliferous variety of it.

var.

- ——— var. *virens*, Turner : common.
- ——— var. *stellatus* :—*F. stellatus*, Ray 44.
appears to be a distinct species, of
a texture very soft and different
from *F. crispus*, having a pecu-
liar smell, and bearing fructifica-
tions in its extremities ; it grows on
rocks in great plenty, in company
with *F. alatus*.
- ——— var. *equalis* ; not common.
- var. *compressus* ; Gmelin, VII. 3 ; common.
17. *F. mamillosus* ; common on rocks.—*F. cera-
noides*, Withering, Hist. Ox.
XV. 8. f. 13.
- ——— var. *acutus*, Turner : and other
varieties, which seem to vary
into those of the *F. crispus*.
18. *F. canaliculatus* ; on rocks, very common.
19. *F. loreus* ; common on rocks, in every state.
20. *F. aculeatus* ; thrown on the shore, not very
common.
21. *F. coccineus* ; Withering ; *F. plocamium*, Gme-
lin ; on rocks, on other fuci,
and common on the shore.
- ——— var. *cartilagineus* ; not uncom-
mon : *F. cartilagineus*, Wither-
ing, Miller Illustr. HI. Linn.
Trans. 187.

22. *F. plumosus* ; common.
23. *F. nodosus* ; very common.
24. *F. lichenoides* ; common, in the fissures of shelving rocks, covered at high water ; *F. pygmæus*, Withering, Lightfoot.
25. *F. filum* ; common, on the shore.
26. *F. fastidiatus*, Linnæi : III. Linn. Trans. 199. scarce ; considered as a variety of *F. rotundus* by Turner.
27. *F. lumbricalis* ; very common : *F. fastidiatus*, Withering, Lightfoot.
28. *F. confervoides* ; Gmelin 13.
29. *F. albidus* ; common. III. Linn. Trans. 210. considered as a variety of the last by Turner.
30. *F. subfuscus* ; not very common, and without fructifications : I. Linn. Trans. 131.
31. *F. variabilis* ; III. Linn. Trans. 220. considered as a variety of *F. subfuscus*, by Turner.
32. *F. articulatus* ; common, on rocks.
33. *F. repens* ; Dillen, X. 9. *F. opuntia*, Turner :— in the clefts of perpendicular rocks washed by the spray ; it differs totally in habit and form from the last, of which it cannot be considered

dered a variety, as in Linn. Trans. III. p. 219. its roots creep very much and are matted ; its leaves are green, and not often articulated.

34. *F. pinastroïdes* ; III. Linn. Trans. 222. *F. incurvus*, Gmelin XI. 1. Withering ; not common.
35. *F. purpurascens* ; III. Linn. Trans. 223. not uncommon.
36. *F. amphibius* ; Withering, Stackhouse ; not common.
37. *F. plicatus* ; Gmelin XIV. 2. not very common.
38. A very small plant resembling a *fucus*, with fructifications in little pods ; growing in sandy basins ; answering Morisson's description of, *muscus marinus lendiginosus*, *minimus*, *arenacei coloris*, and the figure, Hist. Ox. XV. 9. r. 3. f. 2.

None of the fuci are used here for food ; though several kinds might be applied to that purpose.—The authors of the continuation of Buffon are premature in saying generally, “ les habitans pauvres d'Irlande mangent comme le-
“ gume le *fucus saccharinus*.”—All plants cast on the shore are drawn from the beach for manure, and often burnt for kelp.

1. *Ulva intestinalis* ; } common.
 2. *U. compressa* ; }
 3. *U. elminthoides* ; Withering ; thrown on the shore ; scarce.
 4. *U. purpurascens* ; Hudson, E. bot.
 5. *U. filiformis* ; Hudson.
 6. *U. rubens* ; Hudson.
 7. *U. dichotoma* ; var. 2. Withering, *brown* ; common.
 8. *U. fistulosa* ; }
 9. *U. lactuca* ; } common.
 10. *U. umbilicalis* ; common, among rocks and sand : it is sometimes gathered and boiled for sale, under the name of *Sloke* ; no other species of *Ulva* is eaten.
 11. *U. plumosa* ; Hudson—scarce ; growing on rocks, in little basins ; of a fine green colour, beautifully branched and pinnated ; it seems to have been described by Ray, as *Conferva gelatinosa, tenerrima et viridissima, muscum quendam filicinum repræsentans*.
-
1. *Conferva rupestris* }
 2. *C. littoralis* } common ; growing on rocks.
 3. *C. rubra* }
 4. *C. polymorpha*, } common ; parasitical.
 5. *C. fucicola*, }
 6. *C. verticillata*, }
 7. *C. coccinea*, } common ; on the shore.

8. *C.*

8. *C. pinnata* ; common ; parasitical, and floating in the sea.
9. *C. sericea* ; with *C. littoralis*, but not so common.
10. *C. elongata* ; common, on the shore.—*Fucus diffusus*, Hudson, III. Linn. Trans. 197.
11. *C. diaphana* ; on Fuci and on *Confervæ*, not uncommon.
12. *C. ciliata* ; parasitical, not common.
13. *C. fulva* ; Hudson—very scarce.—I saw but one specimen, which answered exactly to the description of this plant ; it grew on a rock in a little basin of salt water, and might easily have been overlooked from the lightness of its colour, and the smallness of its size ; it is regularly pinnated, and bifid near the top.
14. An unbranched light coloured *Conferva*, resembling *C. capillaris*, growing in oozy spots near the beach.
15. *C. confervicola* ; small and greenish ; attached to *C. elongata*, *Ulva fistulosa*, &c. not uncommon.
16. A very small pink-coloured, parasitical *Conferva*, attached to *C. rubra*.

A few more undetermined *Algæ* were observed : and for being enabled to ascertain some of these *Confervæ*, I am obliged to Dr. Scott.

1. *Lichen niger* ; on calcareous stones, rocks, and walls near the shore.

- | | |
|--|--|
| 2. <i>L. parietinus</i> ; | } On rocks and stones near the shore ; common. |
| 3. <i>L. calcareus</i> ; | |
| 4. <i>L. parellus</i> ; | |
| 5. <i>L. tenellus</i> ; Withering ; | |
| 6. <i>L. fastidiatus</i> ; E. bot. 890. <i>L. calicaris</i> , Withering. | |

Tremella hemispherica ; rocky shore near Loftus-hall—dark green, firm ; in old specimens, a little hollow near the base.

Byssus purpurea ; clefts of rocks, near the shore, common.

Asplenium maritimum ; beneath rocks.

Zostera marina ; sandy shores, common.

<i>Salicornia herbacea</i> ;	} Muddy shores, near Fethard.
<i>Salsola kali</i> ;	

<i>Arundo arenaria</i> ;	} Sandy shores, near Fethard.
<i>Phalaris arenaria</i> ;	
<i>Poa compressa</i> ;	

Agrostis maritima ; Withering ; perhaps a variety of *A. stolonifera* ; common.

Festuca glauca ; sometimes considered as a variety of *F. rubra* ; but it appears to be a distinct species ; common, near the sea.

<i>F. ovina</i> ;	} Both grow luxuriantly over calcareous rocks near the shore.
<i>F. duriuscula</i> ;	

<i>Plantago maritima</i> ;	} Common.
<i>P. coronopus</i> ;	

Glaux

- Glaux maritima* ;
Viola tricolor ; with bright yellow
 and white flowers ;
Lycopsis arvensis ;
Verbascum thapsus ;
Bunias cakile ;
Anthyllis vulneraria ;
Leontodon hirtum ;—(*Hedypnois*
hirtum, Smith.) } Sandy shores.
Arenaria peploides ;
A. marina ; (and on rocks and
 walls)
Geranium cicutarium ;
Geranium moschatum ; Duncannon fort.
Eryngium maritimum ; both sides of Waterford
 harbour.

Statice armeria ;
 ————— var. small-leaved ; } Rocks, com-
 mon.

- Sedum anglicum* ;
Silene maritima ; E. bot. 957.
Anthemis maritima ;
Beta maritima ;
Atriplex laciniata ;
Chlora perfoliata ;
Rosa spinosissima ; } Banks over the
 shore.

Cratægus spinosa ; near the shore.

Cochlearia officinalis.

C. Danica ; among stones.

C. coronopus ; near the tower of Hook.

Crithmum maritimum ; rocks, common.

- Aster tripolium* ;
Anagallis tenella ;
Scirpus setaceus ;
Samolus valerandi ;
Equisetum sylvaticum ;
Sium angustifolium ; } Oozy spots near the
 beach.

Epilobium

Epilobium hirsutum ; near the shore.

Hyoscyamus niger ; calcareous soil and sandy shore.

<i>Thymus serpyllum</i> ;	} Grow luxuriantly in the vicinity of the sea, and close to the beach.
<i>Inula dysinterica</i> ;	
<i>Lythrum salicaria</i> ;	
<i>Polygonum aviculare</i> ;	
<i>Lotus corniculatus</i> ;	
<i>Galium aparine</i> ;	
<i>G. verum</i> ;	

The basis of the soil near Loftus-hall is lime-stone, to the north of which is siliceous breccia.

No forest tree or tall shrub can grow in the space here examined, unless perfectly sheltered from all winds ; the sycamore even at Fethard, though alive, has an unhealthy appearance.

WILLIAM TIGHE.

A LETTER

FROM ROBERT SCOTT, M. D. M. R. I. A.

PROFESSOR OF BOTANY

IN

TRINITY COLLEGE, DUBLIN.

DEAR SIR,

As the Dublin Society, over which you preside, anxiously solicitous for the extension of every branch of science in this kingdom, and more particularly desirous of investigating its natural productions (a point that till of late has unfortunately been little attended to) has with this view offered premiums for the discovery of native plants hitherto not described by any Botanic writers, I beg you will be so kind as to lay before the Committee for examining the claims to such premiums the three inclosed plants, which I would have much sooner offered, had I not waited for the concurrence in opinion of Doctor Smith and some others of the more celebrated English Botanists.

No.

No. 1. is a species of Moss belonging to the genus *Grimmia* of Hedwig; it approaches towards the *Grimmia alpicola* of Swartz, but differs specifically in its perigonal leaves being much longer and more rigid, the setæ or footstalks of the capsules longer, and in having shorter furcula or shoots closely pressed together, forming dense rounded tufts, in which its capsules appear imbedded. This plant I have hitherto only discovered growing on a kind of whinstone rocks in the vicinity of Balbriggan, so close to the sea as to be covered by it during the higher tides; hence Dr. Smith has aptly named it *Grimmia maritima*.

No. 2. is another species of Moss belonging to the genus *Dicranum*, and to which the partiality of my ingenious friend Mr. Turner has affixed the trivial name *Scottianum*. This plant I discovered last autumn among the mountains, that lie to the southwest of Swanlinbar on the banks of a rivulet, the soil of which was formed from decayed argillaceous schistus; at first glance it appears in habit to resemble the *Dicranum polycarpon* of Swartz, but differs specifically not only in the form of the leaves, but also in these last not becoming curled when dry, as in those of the former species.

No. 3. is a vegetable substance found growing on detached lime-stones in the bed of a rivulet

vulet in the Queen's county. The stones in this rivulet are covered with a botryoidal or tuberculated crust of soft calcareous matter deposited by the water, that runs over them, and this crust serves as a foil for these plants to spring from, which, on account of their growing on rounded surfaces, and being each formed by tubular filaments rising consequently unequally and diverging, exhibit the appearance likewise of tubercles of a dark green colour interposed between the white calcareous ones, varying much in dimensions according to their age, frequently becoming confluent, and forming groups or patches of an inch or even more in diameter. The filaments, that constitute these tubercles, are, as I have already observed, tubular, without joints, and unbranched, tapering somewhat towards their terminations on the surface, and becoming there of a darker colour; owing, as it would appear, to some granular matter lodged in them, which may perhaps be the seeds—the tubercles, when moistened with water, become gelatinous or slippery to the feel, and in this state yield an odour very similar to that of marine plants; they are compact and hard, from their filaments being as if cemented together by the continued deposits of calcareous earth. In the drawing, that accompanies the specimen, the letter

B

B represents a section of one of the tubercles considerably magnified, remarkable for a banded or fasciated appearance, arising from the filaments being in some parts invested or covered over with calcareous earth tinged probably by iron, while in others being free of this they show their natural green hue. At letter C is represented the same section, after having been deprived of its intervening calcareous matter by maceration in vinegar; in this the filaments are exhibited as appearing under the microscope highly magnified, and in great measure loose and unconnected with each other. This plant would have been by former Botanists ranked under the head of *Tremella*, a genus then composed of very heterogeneous substances, both with respect to their structure and economy, but which term is now very justly limited by Persoon to one division of *Fungi*, while some other species of this discordant collection have given origin to some new genera. Of these the *Linckia* of Micheli, &c. and the *Rivularia* of Roth are those, that approach nearest to this plant in structure, but I apprehend, that even these genera, at least as their characters now stand as given by Roth, will scarcely admit of its being ranked under either of them, and probably it will be necessary to constitute

constitute a new genus for this and some others closely allied to it.

I am, dear Sir,

With the greatest esteem,

Yours,

R. SCOTT, P. B. T. C. D.

To General VALLANCEY, V. P.
of the Dublin Society.

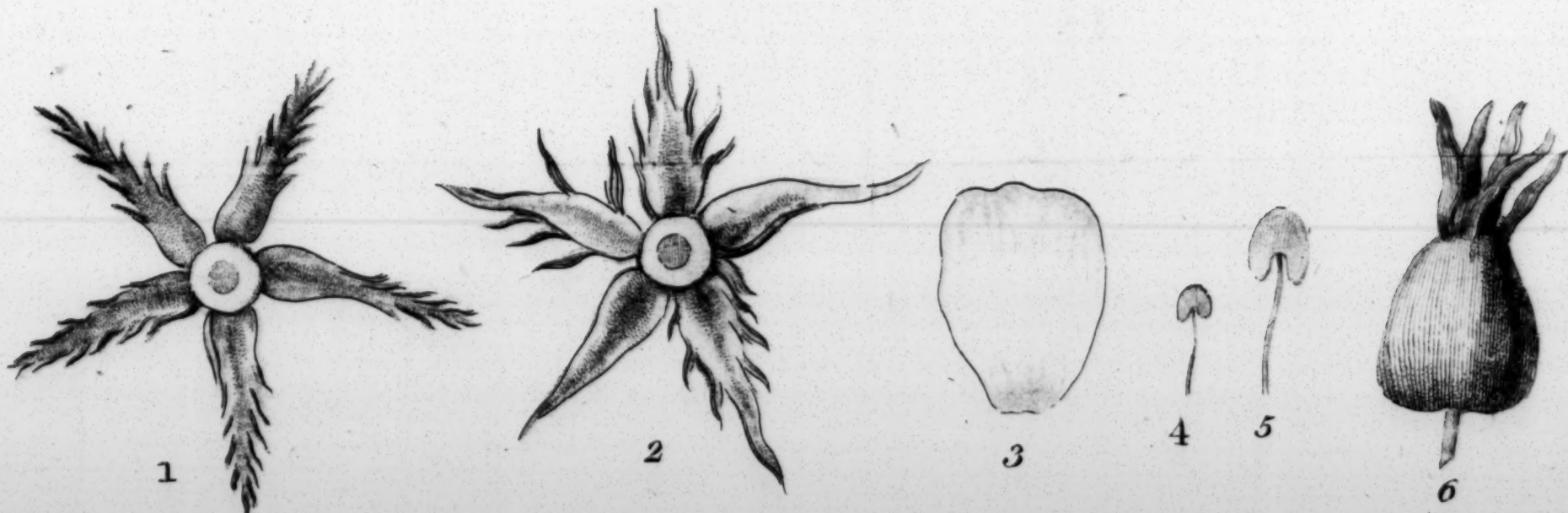
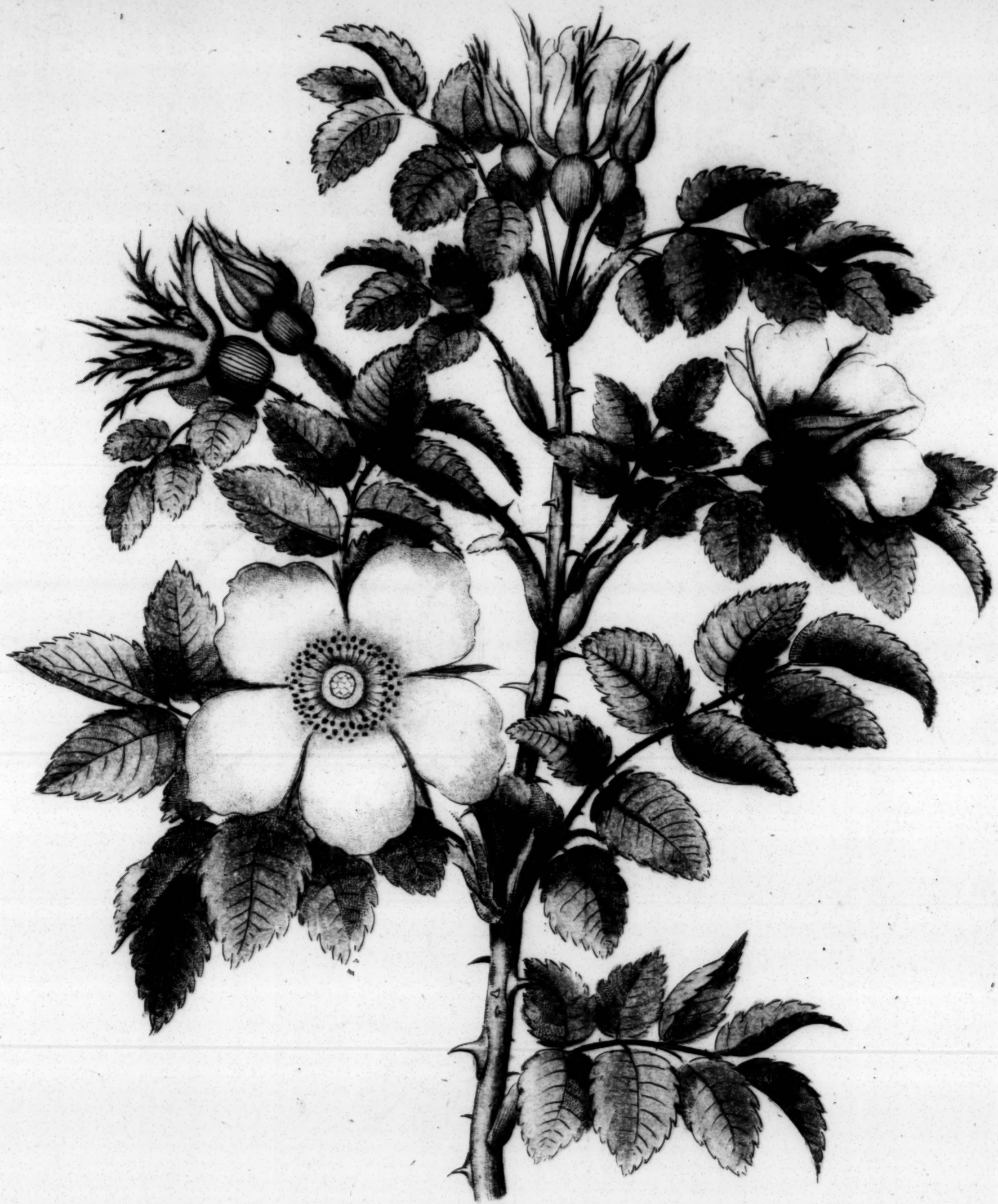
Note. A premium has been adjudged to Doctor Scott, for each of the specimens mentioned in this letter, according to the proposal of the Society, for *producing native plants not hitherto described.*

A LETTER
FROM JOHN TEMPLETON, Esq.
ON A NEW
SPECIES OF ROSE.

DEAR SIR,

You were so kind as to promise to lay before the Dublin Society my claim on them for the discovery of a new plant; the present one is a rose, which I have been induced to consider as new, from its not agreeing with the description of any one of the genus hitherto described by any author, and from the assurance of both Mr. Curtis and Mr. Dickson, that it differs sufficiently from any one, with which they were acquainted, to lead them to consider it as a new species.

I first



1 Calyx equally common as 2. 3 Petal. 4 Stamen with an anther. 5 same magnified. 6 the Fruit.



I first discovered it on the side of the road leading from Belfast to the village of Hollywood. I have since found it in another part of the county of Down, and in the county of Derry. It grows to five or six feet high; the stems reddish, and a very dark red in winter; armed with crooked aculei; branches less thorny than the stems; leaves nearly round (or round oval); dark pleasant green above, lighter or somewhat glaucous underneath; very sharply serrate petioles unarmed; peduncles unarmed, sometimes two together, at other times single; two or three of the calyx leaves simple, the others pectinated; petals entire, slightly tinged with red; flowers sweet scented; germs inverse pear-shaped. It begins flowering in July with the *spinossissima*, and continues until November. From the above description the specific character will be, rose with inverse pear-shaped fruit, smooth peduncles and petioles, and round oval leaves sharply serrate. At first I considered it as the *rosa pimpinellifolia* of Linnæus; but Dr. Smith assured me, that Linnæus's *pimpinellifolia* is the same plant as his *rosa spinossissima*. It differs from this last in the most essential parts of its character; the inverse pear-shaped fruit not only distinguishes it from *rosa spinossissima*, but forms a new division in the genus; and as

it has not been before described, I may perhaps be allowed to give it the name of *Rosa Hibernica*. I gave a plant of it to the Glasnevin garden, and I believe Mr. Underwood considers it as a new species*.

I remain,

Sir,

Your humble Servant,

JOHN TEMPLETON.

*Orange-Grove,
December 29, 1802.*

*To General VALLANCEY, V. P.
of the Dublin Society.*

P. S. Collecting materials for a history of the Lough-Neagh whiting, which I consider as the charr of Pennant, I found mentioned in Smith's History of the county of Waterford page 208, that charr had been caught in two lakes on the Waterford mountains; but the extraordinary size of two feet long leads me to doubt their being the true charr, which seldom exceeds twelve inches. I mention this in hopes you will be able to procure a specimen
to

* The Society's premium, for *producing new plants not hitherto described*, has been adjudged to Mr. Templeton.

to add to your collection, which I much wish to see as extensive as possible.

When I presented to you the specimens of wood, I believe I promised to give you as much of their history as I could. Of the *Eucalyptus piperita* and *Mimosa decurrens* I know nothing as to their qualities as timber; but it is said that there has been no timber found at Botany Bay, but what sinks in water. The *Robinia Pseudo Acacia*, or locust tree of North America is esteemed beyond all others for the durability of its timber, when exposed to the weather, and for making trennels or wooden pins for fastening the planks of ships. Luckily in light soils it thrives well in Ireland, and sends forth suckers by which it is easily propagated. It grows with great quickness; I have had some, which made shoots five and six feet in a season, in a sandy soil. They are not injured by our severest frosts, but care must be taken to place them in such situations as that they will not be exposed to high winds, which often break their branches.

The *Fagus Castanea*, or sweet chesnut, is among our most beautiful trees, of quick growth in a sandy or light loamy soil. There are four on my farm of considerable size; one is above eleven feet in girth, growing rapidly; and yet there is reason to believe them about
a hundred

a hundred years old. The timber is esteemed the best of European growth, for a great variety of uses. In the southern parts it is preferred for wine casks, as it is not apt to warp or shrink. In England it is reckoned the best for hop-poles, as even young poles stand wet and dry better than any other. Its durability has been pretty well determined by an experiment related in Young's Annals of Agriculture.

“ Inch and half planks of trees from thirty to forty-five years growth, after ten years standing in the weather, were examined, and found in the following state and condition.

Cedar, perfectly sound.

Larch, the heart sound, but sap quite decayed.

Spruce fir, sound.

Silver fir, in decay.

Scotch fir, much decayed.

Pinaster, quite rotten.

Chestnut, perfectly sound.

Abele, sound.

Beech, sound.

Walnut, in decay.

Sycamore, much decayed.

Birch, quite rotten.

Young's Annals of Agriculture,
VOL. VI. 256.

A piece

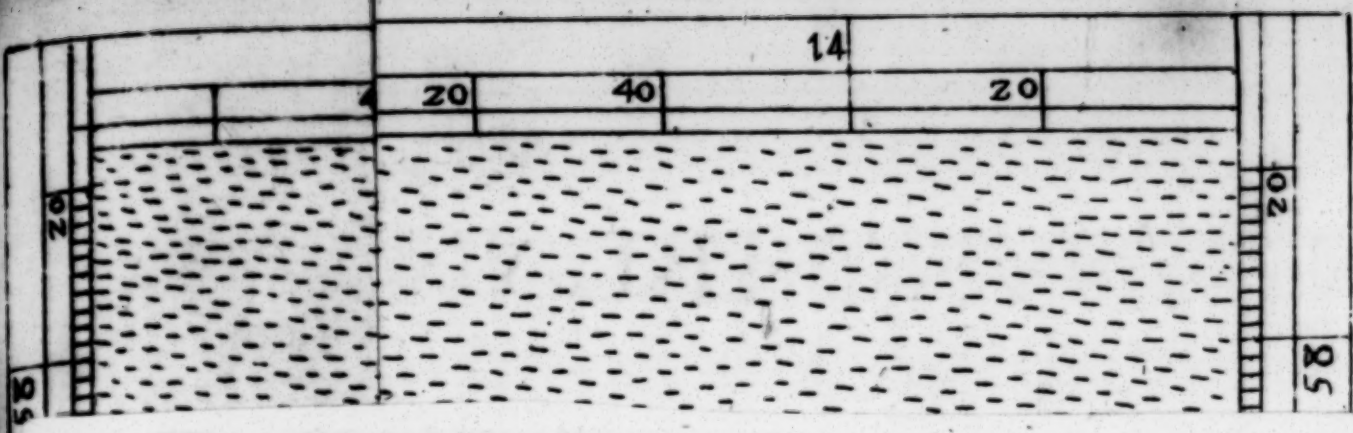
A piece of a branch cut off, and put in as a gate-post twenty-five years ago, is yet perfectly sound, even at the surface of the ground, a time that, I believe, would have rotted the best oak. Another property, which recommends chefnut is, that it stains well, with a decoction of logwood and Brazil-wood, with alum water, varying the proportions at will. I have imitated mahogany so as to deceive most people. In looking over some catalogues I find three books mentioned, which, I think, may be useful in determining your specimens of wood; *Jacquin's Plantæ Americanae*, No. 6213, of White's catalogue for 1801; *Sepp's Representations of inland and foreign woods*, 2 Vol. plates finely coloured, No. 2306; and *Icones lignorum exoticorum et Germanicorum*, neatly coloured, 15s. Edwards' catalogue for 1794, No. 2252.

A LETTER
TO GENERAL VALLANCEY, V. P.
ON AN
OLD MAP OF IRELAND.

SIR,

When I had the honour of presenting the old Venetian map of Ireland to the Society, the members present were unanimously of opinion, that it ought to be re-engraved at their expence, as a record of the ignorance of foreign navigators at that period, in all matters relating to Ireland.

In the year 1380, Nicolò Zeno a Venetian failed to visit England and Flanders, and
without



HYBERNIA NVNC IRLANT

SEPTENTRIO



OCCIDENS

ORIENS

MERIDIES

1 2 3 4 5
cms.



without doubt touched at Ireland. It was one of the first attempts at discovery, since the revival of navigation. This voyage when published was received as true, and considered as a narrative literally exact in all its parts. It afterwards experienced a different fate; and when navigation was improved, and various expeditions to the same parts had been undertaken, the difficulty of reconciling it to the history and geography of those places, and a certain air of fiction, which part of it bore, occasioned it to be generally exploded. Such at least seems to be the opinion of Hackluyt; for VOL. 3, p. 122, after he has repeated in Zeno's words, that many ships are laden with fish from Freezeland to serve Flanders, Britania, England, Scotland, Norway, and Denmark, he adds in the margin "but not to be proved that any fish ever came thence."

Of late, Mr. Forster in his Northern Voyages p. 178, has shewn pretty clearly, that Freezeland (which the earlier geographers had placed to the west of Iceland, a little inferior to it in size) is one of the Orkneys called Faira Island, or Feras-land, p. 202.

Zeno then gives an account of Estotiland situated 1000 miles west of Freezeland, and
accidentally

1	2	3	4	5
cms.				
ins.	1			2

accidentally discovered by a fishing vessel from the latter country. It is expressly said by Zeno to be an island not much inferior in size to Iceland : it is described as a fertile land, the inhabitants of which were civilized, had princes, in whose libraries were books in the latin language, and an interpreter, who spoke the latin tongue, was found among them, who had been cast there by chance : they had cities, sowed corn, made beer and ale, and had all the arts and faculties we had. Some will have this to be part of America, but west of the Orkneys the continent of America presents to us the entrance of Hudson bay, and both it and its inhabitants are in every respect the very opposite of the above description ; and America is much farther distant than 1000 miles.

Now Leland in his History of Ireland, book II. chap. vi. describing the first expedition of Richard II. who landed at Waterford in October 1394, says, he received at Drogheda the voluntary submission of O'Neal the great chief of Ulster, and of seventy-five other northern Irish potentates, all of whom considered themselves as independent princes and sovereigns ; all which circumstances caused a learned friend of mine to suppose, that by Estotiland was meant Ireland.

Be

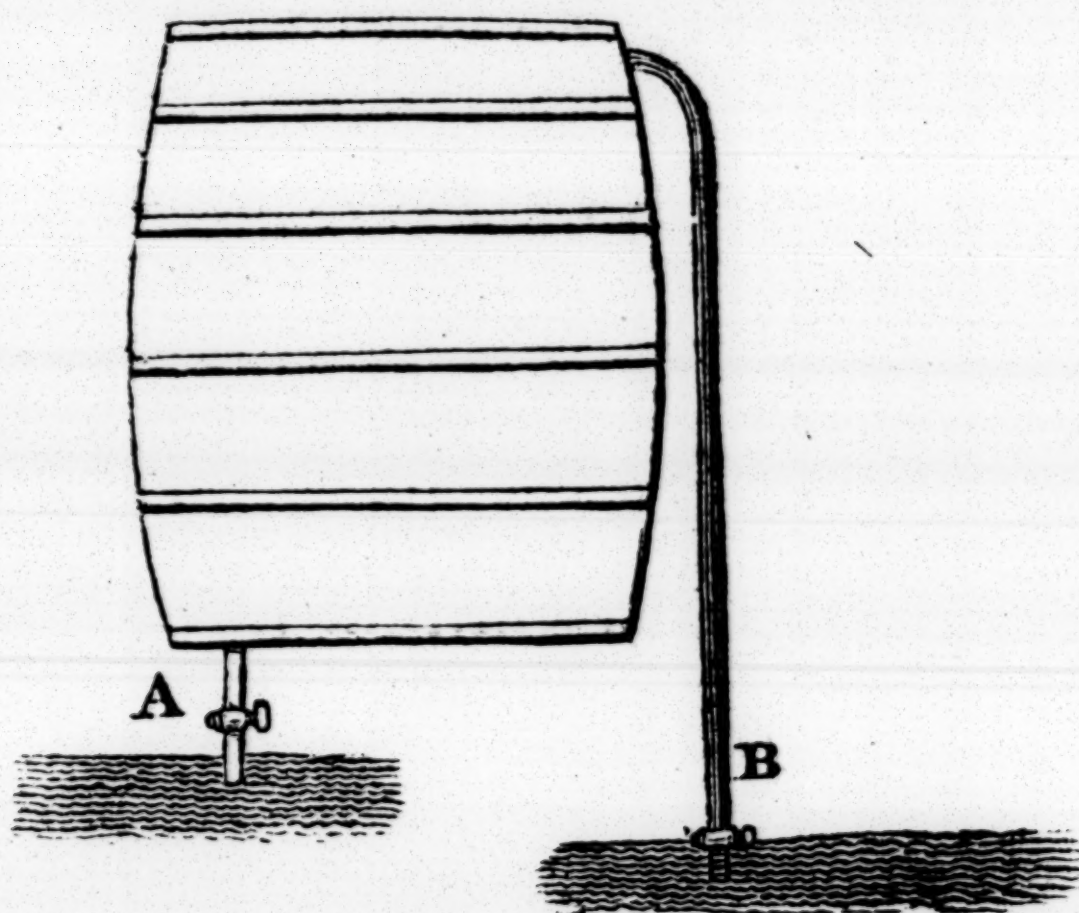
Be that as it may, the Venetian atlas, whence this map was taken, was printed by *Joan. Fr. Camottii* in 1560; and in the College library is a MS. atlas made by *Baptista Agnesi*, a native of Genoa, in October 1544. In both, Scotland is made an island, nearly two hundred years after Zeno's voyage. And in Agnesi's, England, Scotland, and Ireland are represented as three distinct islands of equal size, a circumstance which proves the very little knowledge, that prevailed then in geography in such a city as Venice, at so long a period after the time of Zeno.

Anderson says, the first geographical maps were brought to England in 1489, and the first exact geographical map of England was in 1520.

A MEMBER.

The Syphon applied to the Worm Tub as a refrigerator, or, a plan for conveying water in any quantity to a Worm Tub of the largest dimensions, if perfectly air tight.

By ALEXANDER JOHNSTON, ENGINEER.



A. The feed pipe of cold water.

B. The hot water, or waste pipe, the end of which must be about two feet lower than the feed pipe, to make it act with full effect.

When you commence work, you must shut the cocks, and fill the tub through a hole at top, and, of course, both pipes, and, when full, stop the hole at top, and open the cocks together; the

the water will then commence running, and continue as long as the supply holds good, as it acts in every respect on the principal of a siphon.

By this means pumps, horse-mills, and other machinery are rendered unnecessary for that purpose.

The application of this improvement is simple, and executed at a very little expence. The saving, I think, may be calculated at upwards of one hundred horses per annum, for the city of Dublin alone.

I have executed one for Nicholas Roe, Esq. Marybone-Jane.

ALEXANDER JOHNSTON.

Dublin, July 6, 1803.



Fig. 1.



Fig. 2.



Fig. 3.

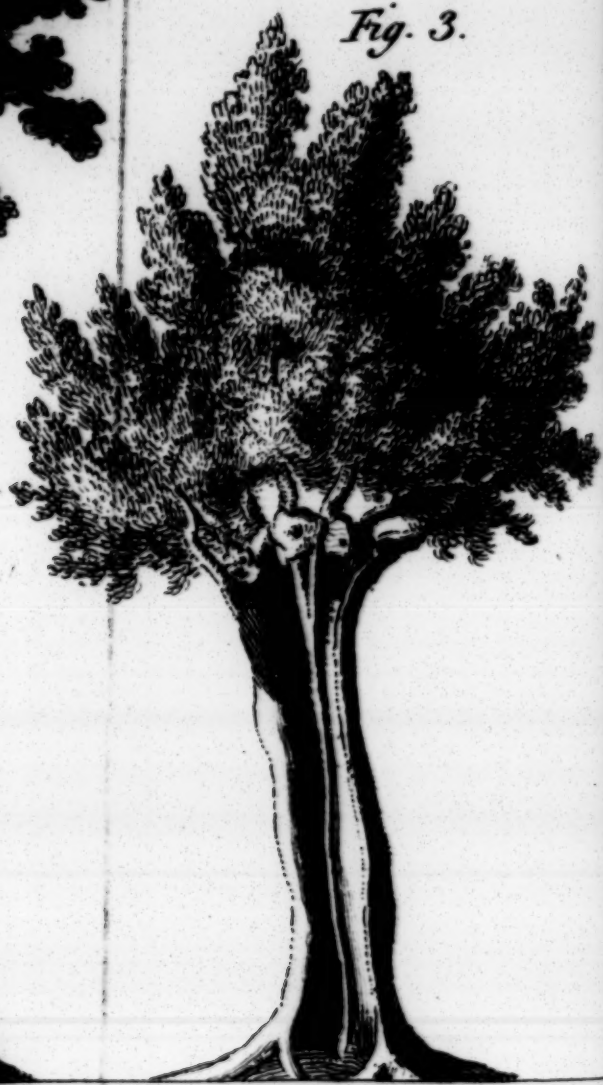


Fig. 4.

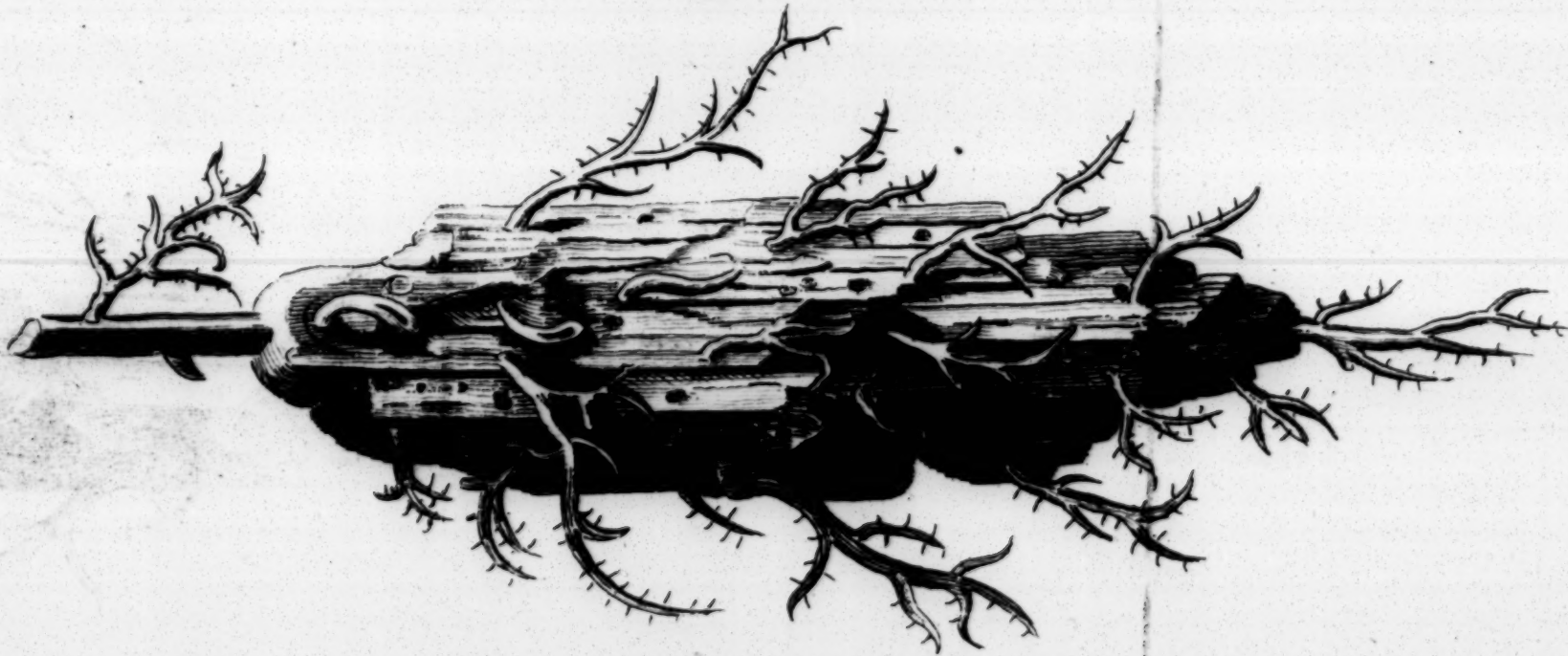




Fig. 1.



1 2
Foot

Fig. 2.



1
Foot



Fig. 1.

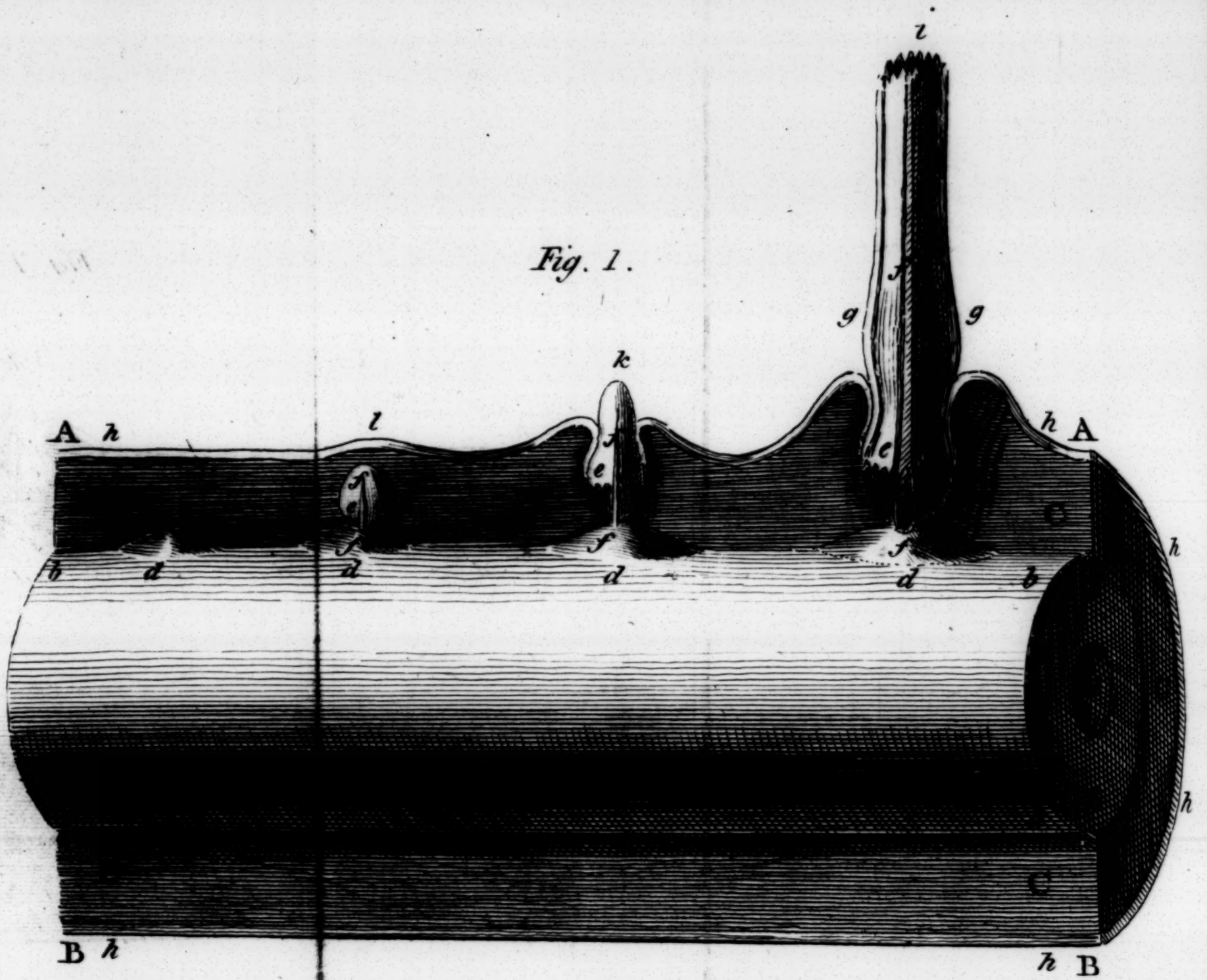


Fig. 2.

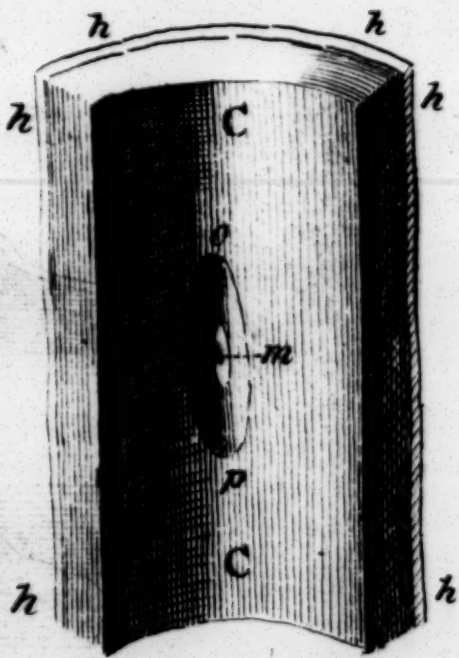


Fig. 3.



Fig. 4.

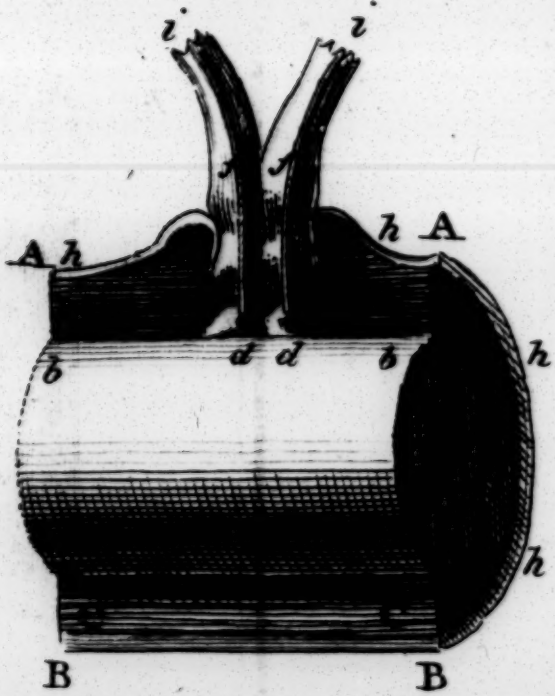
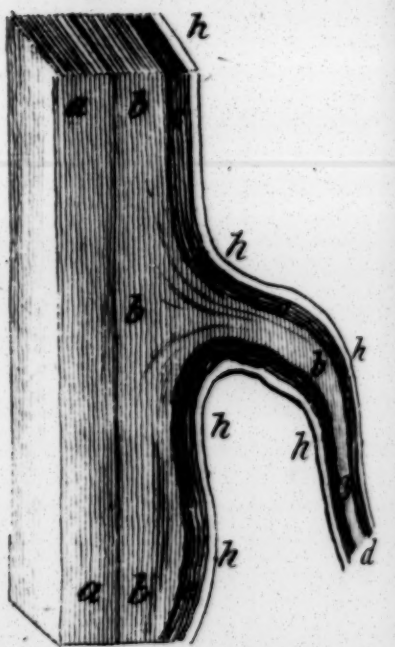


Fig. 5.



A
MEMOIR
ON
ROOTS GROWING
IN THE
INSIDE OF TREES.

BY
MR. J. F. DRYFHOUT,

FROM THE TRANSACTIONS OF THE SOCIETY OF HARLEM,
PART V. AN. 1760.

A

MEMOIR &c.

WITH no less astonishment than pleasure I often viewed that lofty and spreading lime-tree, which stood in the court-yard of the main guard at the Hague. Though it had already arrived at more than one old age, no decay, or diminution of strength was observable; but on the contrary, its green leaves and flourishing branches, along with all other outward marks, bespoke a blooming youth, and this tree, seemingly dedicated to eternity, was the delight of the plumed race. This satisfaction was granted us till the 12th of June, 1758, when, after having withstood many a tempestuous attack, the tree, while yet full of leaves, was by a heavy gale torn up and thrown about sixteen or eighteen feet from its place; after which disaster the real cause of its long duration of youth was unriddled; and, at the same time, a remarkable effort of nature, to supply her own wants herself,

herself, was `discovered: for this tree had propagated roots in its rotten and decayed wood, by which means the same was nourished for numbers of years, and, like a second phoenix, rose anew from its ashes.

This phenomenon appears unprecedented, not only to myself, who have never heard or read of any thing comparable to it, but likewise to all the judicious and attentive lovers of natural history, nay even to people, that for years have dealt in fire-wood, and felled, handled, and cut thousands of various sorts of trees; hence I count it worth the trouble of imparting to the curious lovers of the study of nature a concise description of it, along with the requisite delineation of this singular spreading of roots; adding what I myself, by unveiling and viewing the nature of this phenomenon, have observed and judged; flattering myself with the hope, that the errors I may have run into on this occasion will be excused and rectified by them, for the advantage of the sciences.

The aforementioned tree, *Pl. 1. f. 1.* leaves and branches being off, proved by my measuring its pieces, as they lay in the timber-merchants yard, to have been about sixty Rhenish feet in length, and fully four in diameter.

About

About eighteen or twenty feet above the ground, it divided into two main branches, each of them two feet in diameter; and both, though the one a few feet higher up than the other, were as well as the trunk hollow all the way down to the ground.

In one of these main branches appeared, as it were in a pen-case, of the circumference of one foot and a half, a broken, though still perfectly green, smooth, and even fistular root, *Penwortel*, fully three inches in diameter. This fistular root, about eight feet in length, proceeded from the callous edge, which the overgrowing of the parts, whence, many years ago, a branch must have been broken or cut off, had formed outside and inside the cavity; besides which, nothing singular appeared in this place.

The other main branch, of which that part, where the same had been connected, and afterwards separated from the adjoining one, is accurately represented on a large scale in *Pl. 2. f. 1.* was very remarkable, and deserves therefore to be more minutely described.

It is beyond doubt, that those two main branches must have been broken and separated a great while ago; since the entire right, as well as part of the left side of this main branch, had a considerable seam, or callous edge, *Pl. 2. f. i. a a a a a.* And, as I have
been

been informed, these two branches had around them an iron hoop some years past, in order to keep them together. Whether a similar callosity may have been on the opposite part of the other main branch, I know not, but it appears very probable to me that there has.

On the upper part a recently broken, but still quite fresh fistular root, fully two inches thick, had grown from out of the inside of the callous edge, *Pl. 2. f. i. b.* which, beside the continuation of this callous substance, had shot upwards, inside the cavity of the branch, and clung to the same, as far as one could thrust in the hand to examine it, and which is represented in its amputated state, *c.* Whether this root had likewise extended downwards to the lower extremity of the trunk, and there helped to form that wonderful ramification *f. 2.* which is to be instantly described, I have not been able to trace, because the greatest part of the splinterings of the tree had fallen between both; still this appears very probable to me, since the root had come forth but a few feet above it, and was thick enough to be able to reach the ramification.

To this fistular root, as well as to the aforementioned callous seam, were joined several small roots, *d. d. d. d. Pl. 2. f. i.* which
did

did not appear withered, but fresh and supple, having by means of the circulation of fluids, which also takes place in trees, drawn their nutriment hitherto from the tree itself, to which they seem to have been of no service for a series of years.

This tree *Pl. 1. f. i.* was very remarkable on account of its singular intestine ramification, *Pl. 1. f. 1.* and *Pl. 2. f. 2.* which was of a deep yellow, rather brownish colour, resembling, as to its outward appearance, that of a well formed bundle of twigs,

The ramification being much compressed within the cavity of the tree, and in constant progression, was by the frequent entwining of the parts grown into one body, and kept the trunk always expanded, and caused the same to grow in circumference, while at the same time their broken or splintered ends had got callous knobs, as if cast and hardened in a mould, taking exactly the form of the inequalities of the interior surface of the tree, occasioned by a former amputation, and by an uneven growing and joining of branches; as it is likewise to be supposed, that the perpetual condensing and peripheral augmentation of the embodied roots had slowly split the trunk, till about three feet from the ground,
and

and that a calosity had thus far seamed the lips of the wound, which by the violence, with which the top was carried off, seem to have parted farther asunder than what they were before; which however may be better seen *Pl. 1. f. i.* than described.

About three feet from the ground, where the said split terminated, the cavity of the tree was filled with a substance like earth, which was damp and of a brownish black colour, in which the lower extremities of the ramification, which were thinner than the upper, had taken root before the trunk was yet extirpated; I thrust my cane, its full length, with great ease, downwards into the said substance, from which I drew two conclusions; the *first* is, that this substance was perfectly similar to recently dug, mouldering garden-earth; and the *second*, that the cavity of the tree extended downwards to the very bottom. But whether the ramification did likewise reach that far, I can, however probable it may appear, not ascertain, having seen it only after it was broken and chopped into pieces.

As soon as I had viewed this ramification, I called to mind that, some years since, I had seen an entire hollow willow-tree, split from the top to the but, which tree stood about a quarter of an hour's walk from the Hague,
near

near the foot-path, that leads from the house *te Werve*; from its callous knob proceeded downward a single fistular root, that measured about one inch and a half round its upper part, and in form resembled a reversed bean-stick, which had in the centre of the tree, as if in an open pen-case, grown, unadhering to the sides, straight downwards into the ground, where it had taken such root, that with all my strength I was not able to pull it up. This tree *Pl. 1. f. 3.* stands yet in the same spot, but deprived of its fistular root, probably at a time when its top was lopped, which, since my seeing it, must have been done oftener than once.

After discovering that singular phenomenon in the lime-tree, I have ever since made it my study to examine all such trees, as appeared to me to have roots inside them; and though I have inspected more than two hundred, as well lime, as elm, oak, and beech, yet no root could be met with in any of them; but among the willow-trees I have found many in the vicinity of the Hague, that had whole clusters of roots growing inside them out of the callous edges, which the repeated amputation of the branches had occasioned; for instance, two aged alder-trees on the Ryfwyk road, near the village of that name, that had very remarkable roots inside them,
among

among which there were some about the thickness of a little finger ; and among the capillary roots of the above mentioned willow-trees, here and there a single one of the thickness of a tobacco pipe, or a pen ; and lastly two poplar-trees, the one standing south-west from the road, the other near the Leiden boat-road, on the height of the village of Vorburg.

Besides, I further discovered among the willow-trees, they being the most suitable for these investigations, two, which, like the fore-mentioned alder-trees, were very remarkable and had much similarity with our present subject. The one standing on the Delft boat-road, not a great way from Hornbrug, had, as represented *Pl. 1. f. 2.* near where its boughs had frequently been lopped, and grown again, an oval hole about eight inches in length, formed there by the amputation of a branch, and which hole was as represented *Pl. 2. f. 1.* seamed round about with a callous edge, whence proceeded downwards several small roots, of which some were of the size of a tobacco-pipe and less ; as also the poplar-tree, standing near the Leiden boat-road, on the height of the village of Vorburg, had likewise a similar opening about the middle of the trunk with a callosity, whence small roots proceeded.

The

The other willow-tree, which stands about an hour's walk from the Hague, in the back way near the same village, had in the middle of its distorted trunk a considerable scar, a foot and a half in length, and about three inches in breadth, through which one could see into the tree, where I observed a very fresh still growing fistular root, nearly three quarters of an inch thick, which took its rise a little higher up in the trunk, proceeding from the under part of a thick down-bending gathering of a callous substance, which did cover, inside, a very small, outwardly hardly visible rent in the tree; my reason for marking this case of callosity, with the twigs placed on it, shall be explained in the sequel.

This root stretched down into the mouldered part of the tree, in which the same was so firmly fixed, that it was as little in my power, as in that of any curious person passing by, to pull it out; and the contusions, which the root had received from my hands at that time, I found some days after grown over with a callous substance, which will still be on it, if it has not been torn away by others.

Soon after finishing this treatise, a person acquainted me that, about three or four years since, a lime-tree of equal size, and
upwards

and upwards of a hundred years old, then standing in the garden belonging to the Orphan-house here at the Hague, had by him been felled; that it had been hollow throughout, and full of roots, some of which were as thick as a man's leg; that every thing did correspond with the here described lime-tree, which he had carefully surveyed; and that the said Orphan house-tree had produced more than eight fathoms of wood.

Having thus communicated the description of this singular phenomenon, along with my remarks on the same, I shall now make a transition from the history to its cause, with a view to enquire how the same originated, and more minutely to examine its requisites.

From motives, which I shall afterwards mention, I have thought best, first of all to look, by aid of my own experience, for the beginning of roots, coming forth from twigs, after they have been set or planted: and should I per adventure light on any thing here, that others before me have already observed, I may freely declare, that I have not borrowed, but sought myself; and my researches will in that case serve, either to confirm the truth of a precedent discovery, or to refute what has been advanced without authority.

In

In the months of July and August 1758, I set a great many willow-twigs about six inches long, partly in glasses filled with water, and partly in the ground, which began to radicate or shoot their roots on the 8th, 10th, or 12th, day according to the weather's being either warmer or colder.

Conformably to more than fifty observations, made in different ways by the aid of magnifying glasses of various powers, I have delineated a root just entering into existence, and followed the same through its successive progressions; I have added the twig that produced it, and in order to make it more visible, the whole is exhibited *Pl. 3. f. i.* in the eighth gradation, partly in its natural state, and partly in a state of section.

A. A. B. B. represent the twig; *a.* its pith; *b b b b b b* the wood divested of its bark, but still in its natural and undivested state; *C C C C C* the bark, and *b b b b b b* the epidermis, both in a divided state; *d.* marks a bud, or little protuberance in the wood, which forms (*f. 2. o. p.*) a cavity in the bark. From out of this bud proceeds the sprout *f. f.* (*f. 1. and 3.*) which pressing through the little oval hole (*m. f. 2.*) in the bark, *C. C.* (*fig. 1. and 2.*) gets there clothed with the matter *e e* (*f. i.*) by which it becomes a body, and in progress of time appears to the eye like a silver-white,
sharp

sharp-pointed little pin *k.* (*f.* 1.) and so goes on growing progressively. The little root *i.g.g.e.e.* (*f.* 1 and 4.) is as well as the bud *d.* represented in its natural state, that is, undiseased; however, the root is as if shining through, which is done in order that the reader may be facilitated to view the coming forth of the sprout *f. f.* Farther, *g.g.* is its epidermis, which begins at *e. e.* and is entirely separated from that of the twig; the scalloped line *e. e.* marks the separation from the *outer-coat* *g. g.* of that part of the little root, which is anastomosed or propped into the bark of the twig, whence it derives its nutriment and growth. This little line is indented, because the epidermis, which here begins and ends, always tatters when the root is torn out of the twig. These roots may very justly be compared with acorns, which have something similar fixed in their under parts or cups, through which they are fed; but these being always provided with a separate outer-coat, they are by their cups sufficiently inclosed and encompassed, till they grow out of it; and in the same manner as one lifts the acorns out of their cups unhurt, one may pluck the fore-mentioned root by a gentle touch out of the twig, which, when brought under the microscope, appears as in *f.* 3. where *e. f. e.* marks the part as still inclosed

still inclosed within the bark, and *e. e.* its separating itself from the epidermis.

But before I proceed, I shall remark, that these delineations do not represent one single observation, but many compared together; and that the figures are sketched more accurately than as nature produces the originals; for some roots come forth awry, others curved, and again others thwarted; some have a round head, others one of a conic form, as every body that knows the sportings of nature will easily conceive; but as to the essentiality and the respective parts of the root-spreading, the reader may rest assured, that the representations perfectly correspond with nature.

This may suffice in as far as relates to the disposition of the roots; but as to their origin and manner of growing, I have observed, by the aid of many, with each other confronted, and always corresponding trials, that the very first beginning of a root consists in the little knob (*d. Pl. 3. f. 1.*), which in fact is only a budding from the wood, and of the same stuff, but in colour somewhat fainter. This little knob, making place for itself in the bark, forms the small cavity in the same, as represented *a. p.* (*f. 2.*) and this is the first degree of vegetation. Shortly after, as the second step, there proceeds

proceeds from out of the cavity a sprout *ff.* (f. 1.) which stands in this cavity, as it were rooted in, as yet very tender, though the foundation of the wood of the future root. This sprout, taking the third step, bores now an oval hole *m.* into the bark *C. C.* (f. 2.) through which it shoots forth. Here the sprout, having penetrated into the bark about the thickness of a nail, becomes, as being the fourth step, invested with the stuff *e. e.* (f. 1 and 3.) which is the foundation of the bark of the root, and which is decked at *e. e.* with a fleece *g. g.* which is the foundation of the epidermis, and completes the first beginning of a root.

Vegetation being thus far advanced, there begins to appear, on the surface of the twig, the knob *l.* (f. 1.) which when it breaks produce the young root, in the form of a little silver-white point *k.* that then makes its progress.

This knob, or first visible beginning of a root (see *d. f. 1.*) is so needful a requisite, that, though two or more roots grow so near one another as to be knotted together, each has its separate knob or bud whence it proceeds, being similar to the bulbous plants, where every stalk has its separate bulb *d. d.* (f. 4.)

Hence

Hence it is evident, that we can search no deeper for the origin of roots, than the surface of the wood right under the bark; having, notwithstanding the attention I paid, and the proofs I gathered from cutting the knobs *d.* in thin slices, both in a parallel and horizontal direction, followed up by the most minute examinations with the microscope, never been able to discover deeper marks, or first traces of the vegetation of roots, in any of the twigs I have tried; nor have I, even in lateral shoots of common roots of various kinds, found the origin lie deeper; certain roots of the elm-tree excepted, which seem to sprout from the pith; but this deserving farther enquiry, I resume the former subject.

If a twig, previously divested of its bark, is put into water, one may decide, when the knob appears on the wood, whether it indicates the production of a root, or a branch; because a knob, which is designed to produce a twig, bores through into the pith, and is that far provided with a sprout, whence it clearly appears, that a twig derives its existence from the pith, and a root solely from the wood, so that in branches, as in roots, wood is produced by wood, bark by bark, and pith by pith.

I know full well that botanists ascribe pith likewise to roots; but what they call pith appears to me to be no other than a conjunction of the filaments of the wood, and the capillary vessels in the centre of the root; whereas the pith of branches seems to consist of a sort of little glands, wherein the barky or woody parts of the sap are separated for the production of leaves, blossoms, and fruit; which in roots, being no other than a previous and raw preparation of the vital juice, is not necessary, because the roots actually proceed from the wood, and have no occasion for any pith; and it will, methinks, appear clearly to the attentive observer, when he compares, with the microscope, the so called pith of the roots with the actual pith of branches, that the roots have no real pith, but consist solely of wood, bark, and epidermis.*

As

* It is not my design to give a full description of the seminal apparatus of roots, much less to enter into combat with botanists about this matter, my abilities being too feeble; but I mean only to communicate what, after weighing the subject, has appeared remarkable to me; nevertheless I shall attempt to defeat some objections, that per chance might be made to my hypothesis; as for instance, how it is possible, that roots, if without real pith, can bring forth as well from the earth, as in the air, branches and leaves, the primary cause of the same being evidently met with in the pith? To which I reply, that in such cases we may admit, that the

As for the primary cause of the knob, it being hid from the eye can be discovered only by conjecture.

It is probable that in the sap, which, as has been maintained by botanists, circulates in trees, as the blood does in the animal body, is lodged a seminal spirit or first beginning of fruitfulness, originally existing in the *seeds* of trees and plants, which, when ripe, contain this seminal spirit in a state of maturity, till by virtue of the soil, by the influence of moisture and warmth, and by the exertion of the matrix it is set free, and at liberty to act, and so produces sprouts shooting upwards, and roots downwards; now I conceive

C 2

that

the great supply and stagnation of the vital juice in certain parts of the roots, or some other unknown cause, forms a real pith, by which means the root is metamorphosed into an actual branch. This ought to seem the less strange to us, when we recollect that a polypus, whatsoever way it may be cut through, grows a perfect polypus again, in as many parts as have been separated. Now, if a head, a stomach, &c. may grow again, either half or whole, in order to renovate the frame of a polypus, what wonder then if a little pith, according to the demands of nature, be renewed in a root, that it may grow, and by the addition of so trifling a matter be transformed into a branch, the essential parts of which it was already possessed of before? Would it not, freely speaking, be a presumption to set limits to the power of nature, who is ever active in supplying her own wants? Our present subject presents us with an apparent instance of this position; we see a complete radification brought to bear, in the most unusual places and most wonderful manner for this purpose.

that, when the impregnation, caused by the seminal spirit, takes place, the pith of the wood is brought forth first of all; that next, and by the same prolific spirit, the now existing pith is clothed with wood, and in process of time, forcing its way into the bark, is there invested with bark, and thus coming forward forms the bud, in which the foundation of leaves and (if a fruit-bud) of blossoms and fruit is laid,* which, as the branches advance, make their appearance, each in due season; but when the seminal spirit enters between the bark and the wood, or into the surface of the wood, then the wood rises by itself, and unendowed with pith presses into the bark, where it is, like the former, equally invested with bark and epidermis, and so forces its way out and becomes a root, not a branch. It is thus, and no otherwise conceivable, how a twig being put in the ground, either by its upper or under part, can shoot roots, where it should have brought forth branches; or how a tree put in the ground reversedly, viz. with its branches and roots uppermost in the air, can bring forth roots from the branches, and branches with leaves from the roots.

But

* This is only to be understood of buds, which grow per chance, and not of those, which appear immediately when the little branches are coming out, and which we see growing out of the eyes, out of which the stems of the leaves come forth.

But there still remains a difficulty to be removed. We may be asked, how it comes to pass, that the self same feminal spirit impregnates the pith at the one time, and the wood at the other ; that those respective parts bring forth roots in the ground, and branches in the air ; and finally, how it happens, that, when roots are wanted, roots come forth, and, when branches, branches. I acknowledge that the finger of the Almighty is here as evidently seen, as it is in this, that the same parents produce sons or daughters, as either the one or the other sex is preferably wanted, pursuant to the divine resolves of the allwise creator ! Who will teach us his ways, and reveal unto us the mysteries of nature ? It being the creator's pleasure, not to act immediately towards the support of things, but by secondary causes, which are the subject of natural history, we are allowed to trace the same, as far as our understanding goes ; though with deference, and with a view to magnify and glorify his name.

Behold then here my conjectures. A twig lopped off the trunk or main branch, whence it derived its nutriment, which it is now deprived of, sucks in greedily, when planted, whatever has the greatest affinity with its former food, as for instance moisture or water, which it receives principally through the
capillary

capillary vessels of its wood and bark; the pith, being a clear substance, does not seem calculated to assist in this operation, but solely designed to rarify and exalt the quality of the vital juice; but as this moisture being intirely raw appears very different from the old sap, which is already present in the twig, I conceive that a sort of fomentation takes place in the wood and the bark, which animates and prompts the seminal spirit to impregnate, not the pith, but the wood, in order there to bring forth not branches, but roots; on the contrary, when there is a superabundance of prepared sap present, which is the case when a tree is cropped, or a considerable bough lopped off, then the superfluous sap falls upon the pith, and by its stagnation undergoes a sort of fomentation, when the seminal spirit, being in this manner likewise let loose, impregnates the pith, and hence brings forth branches, not roots; nay, it has been frequently observed, that whole loads of young branches have come forth forcibly from large boughs, after their being lopped.

Now, having traced the primary cause of roots, as far as lay in our power, it will be time to proceed, and see how near we can bring the same to the subject, which is to be discussed in the present memoir, *i. e.* to discover

discover, if possible, the cause and nature of ramifications in trees, and what way they occur.

It has been already remarked, that the above mentioned observations are not made with a view to define how common roots, or their branches, come into existence, but how those of twigs are produced, because it is here not the question, how the usual ramifications in the ground happen, but how trees come to bring forth roots in an extraordinary manner, from parts designed for the production of branches and leaves? a circumstance, which becomes ocular, when twigs are put in water.

I think we may, from what has already been observed, admit it as a law of nature, that when plants or trees require more nutriment, than what their present roots can give them, nature does the utmost to supply that want, by producing new roots in the nearest and most convenient places. The forementioned twigs for instance, being separated from the trunk that gave them food, stood in want of nutriment, and being set or planted in the earth, or put in water, they shot roots in the same, as in the nearest place, in order to draw their nutriment from thence.

This

This law of nature is further established in multiplying the products by flipping. For instance, when one means to pitch a slip, he slopes it fully half through, and pitches the sloped part into the ground, which, becoming in want of nutriment, owing to its being for the greater part deprived of its connection with the trunk, by the incision it suffered, nature endowed with power from above is ready to supply this defect, and brings forth from the slip, just above the incision, as many new roots, as are sufficient to supply the defect so far, as in a short time to enable these new roots, not only to support the slip, but also to form of the same, after its separation from the trunk, an entire new plant, which they, aided by those roots that are daily added to them, support and bring to a full growth.*

This

* Here might arise a difficulty, as to the pitching of the slip, which in many plants succeeds to perfection without any incision; but the matter being duly investigated, will suffer here no alteration; since in such cases the want of sufficient nutriment may very justly be ascribed to the greedy nature of those plants; either that the sprouting be owing to the number or largeness of their pores, the wideness of their vessels, or strength of their wood; or, that they come forth from their natural tendency to distend, beyond what the nutriment admits of, which the ordinary roots supply them with. For instance the vine, having a very slender trunk, produces yearly a number of long shoots, large broad leaves, and clusters of grapes, consisting chiefly of juice; and from its dropping the superabundant moisture,
when

This is just the same case as the circumstance of the here investigated inward ramification, because it corresponds so perfectly with the factitious pitching of slips, that it may be justly called a natural pitching; since, when the wood of a tree, or a considerable part thereof, begins to decay, the trunk or main branches, like a pitched slip, lose the ability of supplying the top, or the branches and leaves above the corrupted part, with as much nutriment as they require, and did usually receive. Nature is ready to repair this defect; but to form more roots in the ground would be useless, since the communication between the branches and roots is greatly intercepted by the destruction of so many fluices, which can now convey no more sap from the roots upwards to the top; what expedient is left then, and which is the simplest and most convenient way for nature to proceed? No other, than that, like the pitched slips, it endeavours to form new roots above, where the intercourse with the old roots has been stopped, in order that these may provide as much nutriment for branches and leaves, as is requisite to repair their
loss,

when it has not yet been pruned in the proper season, it becomes obvious, what a quantity of nutriment its branches attract; and it is in those sorts of plants, that the incision, occasioning too great an exhalation of the vital juices, might be hurtful.

loss, and promote their further vegetation : but these parts being so far distant from the ground, that there is no soil, into which the tree might shoot its new roots and draw nutriment from, there is no other medium, than to let this take place in its own decayed wood, which exhibits itself here in a very suitable place ; and being exposed to the rain, which it from time to time receives, it produces a compost very fit for a ramification of roots.

Some querist will say perhaps : can roots get a fast hold in mouldered wood, and draw nutriment from it ?—I answer, yes ;—and though the whole of this treatise proves the same, I have, in order to represent it to the eye, delineated (*Pl. i. f. 4.*) an actual ramification, as found inside a willow tree, that had fully retained its outward form ; the detail of which has, from motives of hastening forward, been hitherto omitted.

This little piece, from which I carefully pared the soft but clean wood it lay in, in order that I might be better able to view this ramification, especially the smaller roots and capillary vessels, that played in and through the crevices and little holes of the wood, is here represented as it appeared under the microscope, that is, about twice its natural size, and, as I flatter myself, so distinctly, as to render a farther description of it needless.

I will

I will however add, that the learned know from experience, that trees, plants, and seeds may shoot roots in walls, moss, saw-dust, decayed paper, cotton, wool, sponge &c. and grow; though better in one than in the other, and more spontaneously in moss than in earth itself. Who can be ignorant, that a cucumber, suspended in oats and barley, shoots roots therein, and continues growing, till it loses all its moisture, when it withers and enters into a dissolution of its parts? I need not mention, how hyacinths and other bulbous plants, by being simply put in water, are brought to their full bloom; which may be effected, though the flowers and leaves be put into the water, and the roots placed upwards.

If we consider the case maturely, we will find, that no substance proves more propitious to the growth and nutrition of trees, than their own mouldered wood, and the earth arising from it: and though it seems clear from various observations, that water contains some nutritious parts, and is of itself able to effect vegetation, and promote the same for a considerable time, it is nevertheless certain, that a solid vegetation requires more support, than what water simply by itself can contribute.— Let the nutriment consist of salt, oil, or both, or of something else, it is in the earth, as the same is either rich or poor, dissolved by the water

ter as its menſtruum, which at the ſame time ſerves as a vehicle to carry nutritious moiſture into the plants, and diſpenſe it as wanted : now, in what ſubſtance can we find the oily or ſaline parts in a larger proportion and more homogeneous, than in one, that is entirely compoſed of the ſame, and in which the particles, by means of the commenced and continued putrefaction, are diſſolved, reduced to their primitive ſtate, and thus prepared and made fit to be ſucked in with the water by the new roots, and next imbibed by the tree ?

I have yet to add from experience, that the ſplits and cavities in the putreſcent wood become convenient receptacles for the roots, and the earth hence ariſing being looſe and without coheſion, the air and water, two elements vegetation ſtands ſo much in need of, have free acceſs to them : but, how much kind and quality of ſoil contribute, is a circumſtance ſo univerſally known, that there is no occaſion for me to dwell on that ſubject.

Having thus far proved the above mentioned law of nature to be in force, and hence deduced the cauſe and conſtitution of this wonderful ramification of roots, we have next to inquire, in what way it takes place, and how it comes, that, as experience teaches, thoſe ramifications are only found in trees, that have rents and contuſions, where theſe roots come forth
from

from or near that callous substance, which seams the edges of the flits, and caps the contusions ? This substance I have been inclined to examine very minutely, because I never met with a ramification of this kind, but what had such a callosity for its basis.

As far as I have been able to trace the matter, I find this callous substance to proceed from the sap of the tree, which is conducted towards the contused part of the wood and bark, where by the inworking of the air it is, as it were, kept in coction, till it gets a consistence fit to cover the contused part, fill up the breaches and openings, and heal all the wounds as far as possible.

It appears to me that the callous substance, as well as the roots, consists of wood, bark, and epidermis ; and that, as has been proved above by experiments made on twigs, wood, bark and sap are sufficient to procreate roots, it being already decided, that wood produces wood, and bark, bark and epidermis ; whence it follows, that the callous substance becomes the most convenient foundation of roots, since its wood can bring forth the wood, and its bark the bark and epidermis of its progeny. I have myself discovered by a root grown out of a piece of callous substance that its wood had come forth from the wood, and its bark from the bark of the said callosity, as may be seen plate 3. f. 5. where

where *a. a.* represents the section of a piece of old wood, *b. b. b.* the new wood grown over it from the callous substance, *c. c.* the bark, and *b. b. b. b.* the epidermis ; *d.* farther represents the little root, *b. b.* its epidermis, *c. c.* its bark, and *b. b.* its wood, now inseparably connected with the wood, bark, and epidermis of the callous substance : *b. b. b. b. b.* is the common wood of the callosity and root, *c. c. c. c.* its common bark, and *b. b. b. b. b. b.* its common epidermis.

I have been obliged to content myself, on this occasion, with an old root ; for, notwithstanding all my endeavours, I could not obtain a young one of this nature, much less one in embryo, which necessitated me, when I made my experiments, to have recourse to twigs ; and I was able to raise as many roots from them, and examine them at whatever age I liked ; which the root-gendering callosity of trees does not admit of. And now as evident as it is, that the process of roots requires as much wood as bark, just as obvious is the impossibility of roots growing in the inside of a tree, that is quite rotten, and has neither bark, nor sound wood, which every one will easily conceive ; green wood being alone fit, when split or contused, to produce that callous substance, whence an inward ramification can proceed.

A tree

A tree then, which from its inward putridness becomes by degrees deprived of those vessels, through which it receives its nutriment, and thus suffering the longer the more want, has the same supplied by an effort of nature in the easiest and most simple manner : for instance, finding the callous substance a subject capable of bringing forth roots, and surrounded by a proper soil, in which the roots can spread and find nutriment, nature avails herself of this opportunity, and forms there as many young roots, as are necessary to supply that want.

Respecting the vegetation of these roots, and the consideration, how they can shoot downward such a length, and fasten themselves in the ground, whereas they are often found loose in other cases, we have to remark, that the mouldered part of the tree, which may probably have been augmented by sand or dust conveyed into the tree by wind, might very likely have reached up to, or above the callosity, and lain thus high for a considerable time, or at least till the roots proceeding from the callous substance had fastened themselves in the same, so that the mould being gradually consumed, and, by means of the progressive cancerous diminution of the interior parts of the tree, gradually lowered, had in consequence occasioned no detriment to the roots,
that

that had fixed themselves in it : besides, being incarcerated in the tree, they could not expand themselves laterally, but had their offspring forced downward into the ground, and that more rapidly, than might have happened in the earth, which would not have confined them within such narrow boundaries, in which they could bend no other course, than to penetrate perpendicularly into the ground ; and the mould having thus far ushered them down, and now ended its service, becomes all at once needless : for a root once fixed in the earth, where it finds its nutriment, may well dispense with a soil elevated above the surface, and defy the inclemency of the weather, as every experience teaches.

Now, to wind up the argument, we may, confronting one thing with another, infer, that the following requisites must needs correspond, where a tree is to ramify in its interior : in the *first* place then we lay down, that the tree ought to be of a nature, that does not counteract a ramification, for instance. of the nature of the lime,—alder,—willow,—and poplar-trees, in which I have actually discovered this phenomenon. *Secondly*, that where the leaves and branches require more nutriment, than what can be conveyed to them by the roots in the earth, nature is urged to provide supplies from another quarter. *Thirdly*, that there be a cal-
lous

lous substance present, and placed in such a position, that roots can proceed from it into the interior of the tree. *Fourthly*, that the cavity of the tree be a suitable receptacle for the ramification. *Fifthly*, that in the said cavity a substance be present, in which the new shoots can take root, and find their nutriment. *Sixthly*, that the rain-water have free entrance into the said substance, in order to moisten it from time to time. And *Seventhly*, that there be a drain for emitting the superfluous water, either near the bottom of the trunk, or elsewhere ; so that the roots may not be drenched, as often happens to trees requiring little moisture, when set in grounds, where ditching is neglected, and the water cannot drain off : under these and no other circumstances have I ever discovered ramifications of this kind. As to the two last requisites, the willow-trees, I think, are the best specimen : their tops, leaning back a little, exhibit a convenient recevoir, and at the same time a drain ; and being thus constructed they produce the largest ramifications, especially when on their topped parts moss, grass, and the like grow, which intercept the too rapid exhalation, and assist in a total exsiccation.

The object of this treatise will not permit us to enter deeper into this matter, for which reason I shall conclude, after having offered a few

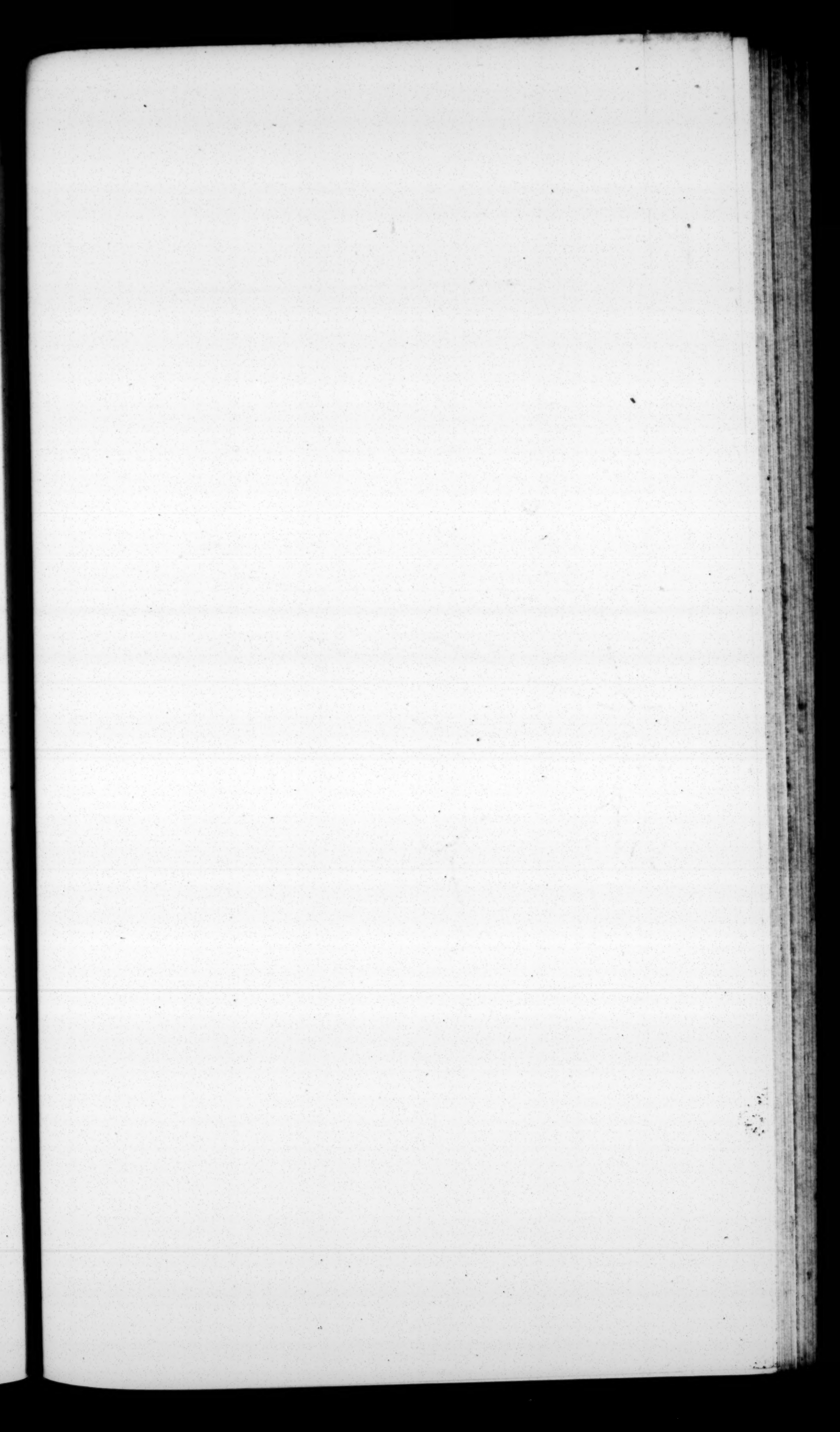
questions relative to this phenomenon, which I submit to the further consideration of the curious lovers of the study of nature.

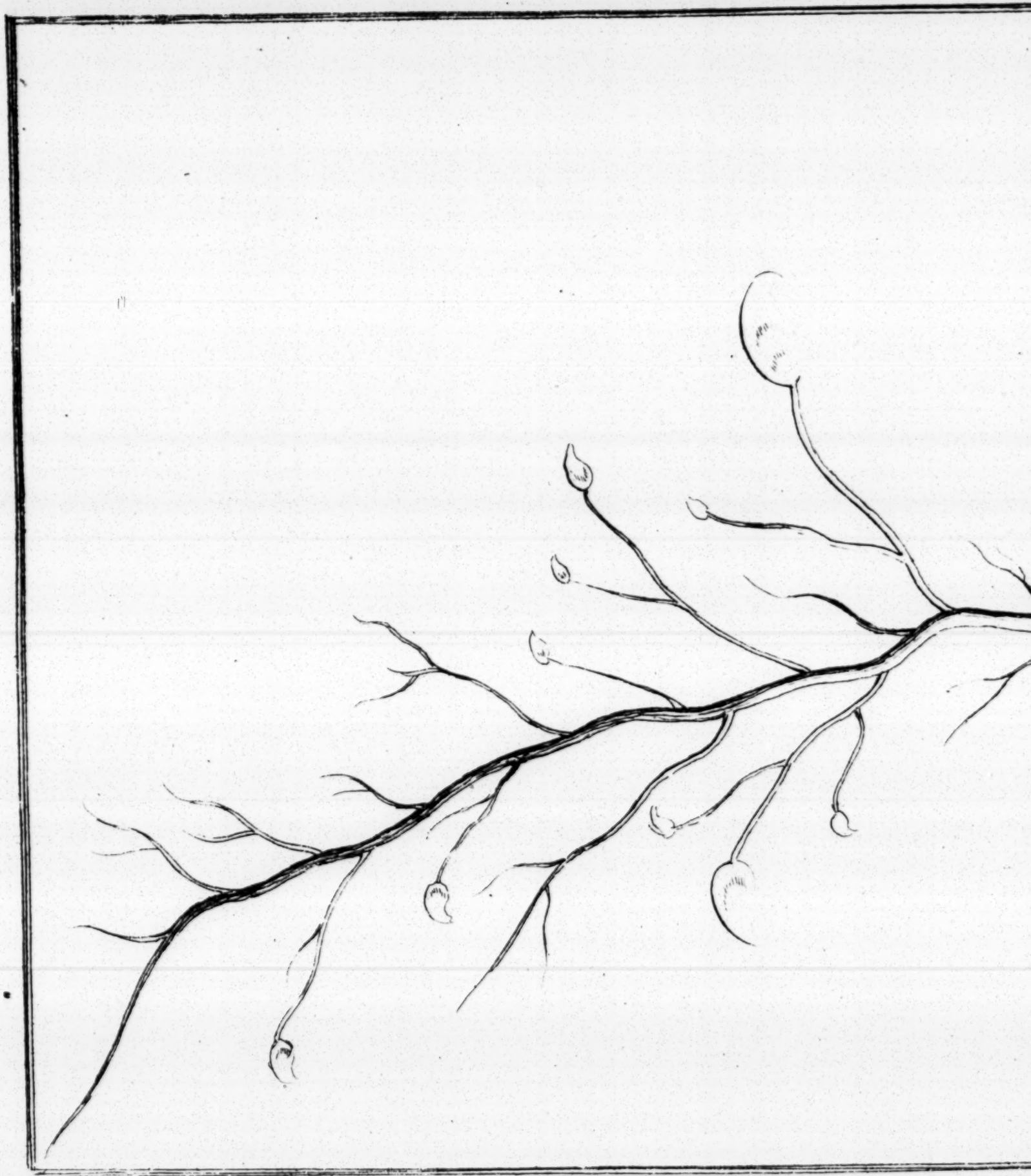
Quest. 1. Ought we not to conclude, that these ramifications help to promote the growing of the tree ?

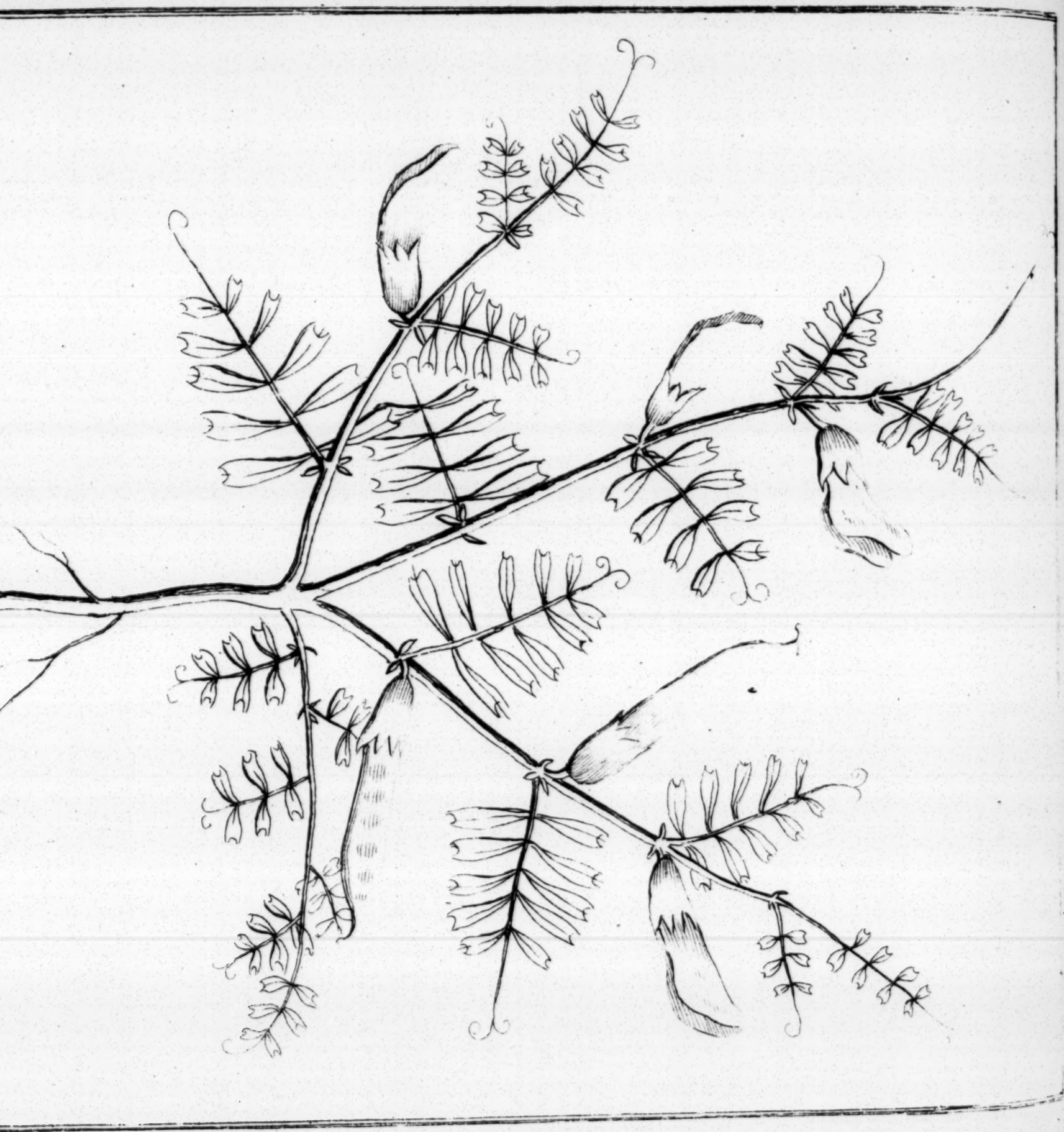
Quest. 2. Could not these ramifications be brought to bear by art ; if, for instance, the cavity of a tree was filled with good earth, and in some convenient places contusions made, in order to cause the formation of that callosity, whence the roots might come forth and fix in the earth ?

Quest. 3. Whether it be possible, that after the bark of a tree is burst by the expansion of the internal ramification, and finally decayed, these roots having grown together, and become a vast body, could produce a new trunk, or rather a collection of trunks, that would bring forth leaves and branches ?

Quest. 4. Whether these ramifications likewise take place in the branches, when grown hollow ; if such a tree ought not to be considered then, as consisting of several trees set a top of one another ; and if it should not grow to a height, which others of its kind can never arrive at ?









EXTRACT FROM

A M E M O I R

BY M. GERARD ;

Read at the National Institute on the 6th of Thermidor, eighth year, concerning two plants, that fructify both in and out of the ground.

AT a time the sexual system of plants was unknown, it is not strange that no wonder was excited by a fruit produced in the bosom of the ground, which, though buried under the soil, attains perfect maturity, and is furnished with reproductive grains. The rare example of a fecundation impenetrable to our view was not capable of rousing the attention of the old botanists, and if their successors have seemed to take little notice of it, notwithstanding the theory of the functions of the sexual organs being generally admitted, we are to suppose, that this instance has been considered as an exception not derogatory to the general law.

Two European plants, comprized under the class of leguminous plants, produce pods concealed in the ground, besides those from their stems; and while one half of them, placed in the element favourable to the developement of their properties, is furnished with leaves and flowers, which are succeeded by fruitful seeds, the other half buried in the ground, void of leaves and scarcely exhibiting any appearance of a flower, becomes covered with pods, the grains of which bear every mark of fecundity. This singular fructification has nothing common with some other productions, except as to locality which is nearly similar. We know that a sort of trefoil* hides in the ground the germ of a fruit already fecundated, and which comes to maturity under the soil; but this trefoil flowers in the open air, where its fecundation meets with no impediment. We also know, that the truffle is a subterraneous vegetable; and we may presume, with certainty, that the concurrence of its sexual organs is not prevented by any intermediate agent, because those organs are approximated. Certain roots, excrescences, and alimentary tubercles have nothing to do with the subject, which we mean to inquire into, whereas there is question of a perfect fructification, caused either by acting principles that are scarcely developed, or by
some

* *Trifolium subterraneum*.

some other means, the effects of which are not accessible to our senses. Two plants, one of which is referred to the genus of the *Lathyrus*, and the other to that of *Vetches*, are possessed of this double reproductive power. As I do not know the former but on the authority of writers, I shall merely prove its existence*, because those two species have been often confounded with each other, notwithstanding their generical difference.

Description of the Vetch with Pods both in and out of the ground.

ROOT.

It is a long filament, inclining to yellow, bearing (*pivotant*) on a loose soil, branchy towards the source, then pushing forth at intervals some small sprigs rarely forked, and furnished, at unequal distances, with some rounded tubercles, sometimes united, but more frequently separated, nearly of the size of a grain of millet a little lengthened.

From the *collet* (junction of the stem with the root) of this root, still covered with earth, there proceeds a flattened, whitish, and transparent filament, placed beside the feminal leaves, or at the distance of about a line,
(the

* The Author gives, towards the conclusion of the Memoir, historical proofs of the existence of that plant, which we did not think necessary to translate—Tr.

(the twelfth part of an inch) either above or below. This filament is quite distinct from the root, and is sometimes followed by another and even by a third filament.

STEM.

The first developement of the seed, which keeps its place*, is known by the appearance of a small stem, from the lower part of which there proceed afterwards some collateral branches reclining on the ground, while the stem remains upright ; but this stem bends downwards according as it grows long, and, the branches rising by little and little, the whole plant retains nearly the same direction, but cannot remain straight without some support.—The stem and the branches, according as they grow large, acquire a similar configuration ; they are smooth, channeled, triangular, and somewhat, but very little, flattened.

LEAVES.

The first leaves, that issue from the stem, grow two by two like those of the lathyrus, being about an inch long and a quarter of a line
in

* In the class of leguminous plants, the seeds of the orobus, lathyrus, and vetches remain buried. Their lobes, at the time of germination, are only swelled, and do not retire but to make room for the little plant to get out, the first shoot of which is a stem, that precedes the leaves.

in breadth; they bear upon a flat pedicle a little narrower than, and half as long as the leaves. This pedicle terminates in a small point placed between two leaves, and has at its base a support or *stipula*, formed by two very narrow and very short points.

These first leaves are succeeded by others similar to those of the branches, and with which the whole plant is soon covered. They are winged, in about four rows of leaves placed either opposite to each other, or alternately, and fixed on a very short tail. These leaves, from the beginning, have the form of a triangle hollowed at the top; sometimes the triangle terminates in three points; it often happens, that the leaves, being more deeply hollowed and divided into two parts, assume the figure of a horse-shoe; but according as the plant grows, the leaves become long, and round at the extremity, from the middle of which proceeds a small point.

These leaves, not having any well determined form, may be compared, some to a triangle more or less widened, others to a semi-circle, and the latest of them to a lengthened ellipsis.

The surface of them appears smooth to the naked eye; but with the help of a magnifying glass, besides the silky and single hairs, with which they are covered, we can perceive the oblique

oblique furrows, which, proceeding from the longitudinal nerve, extend as far as the lateral edges.

The pedicle, on which the leaves bear, rises on the outside, and is hollowed within; the lower ones next to the root generally end in a short, single, and capillary filament, while from those higher up there proceeds a tenon two or three inches in length, sometimes single, but more often forked.

The supports or *stipulae*, placed at the source of the pedicles, are usually triangular, and have a little pillow (*oreillette*) at their back part; but in a less fertile soil they grow large and become indented. In the middle of them is observed a reddish spot lying between the furrows, that run the whole length of them.

FLOWERS.

Each flower is insulated on a very short tail, that grows from the angle formed by the separation of the leaf from the stem. Its calyx is a tube of a pale green, half an inch long, crowned by five narrow, pointed, and nearly equal indentments. This tube is somewhat elevated, and slightly furrowed.

The corolla is composed of four petals, an upper one, two lateral, and a lower one, which

which are joined towards the lower part of the calyx a little above its base, and contracted while they are closed up there ; but on going out of the tube they widen and assume an irregular form, which is called by the name of papilionaceous flower.

In this state, the upper petal appears round, when spread out, with a hollow, from the end of which proceeds a plait, that divides the petal into two equal parts, and the jut of which is external ; these parts lie close to each other before and after their blowing.

The two lateral petals, or wings, are placed opposite to each other ; they are by one half shorter, and by two thirds narrower than the upper one, forming externally only a segment of a circle.

A fourth petal, called the *nacelle* (boat), is placed opposite the upper one ; it is divided below into two parts, that unite above, and which resemble a boat. This petal is shorter than the wings.

The part of the corolla, that is enclosed in the calyx, is of a pale white ; that out of the calyx is generally of a dark purple.

The stamens are placed in the bottom of the calyx. Nine of them are connected together by means of a long and flat membranous substance, from the extremity of which rise an
equal

equal number of oblong antherae, marked with four furrows. The tenth stamen is distinct from that substance; it is composed of a filament placed towards the junction of the edges of the before-mentioned membranous substance, which sheaths the pistil. This filament is also terminated by an anthera. The pistil is composed of an oblong and flattened ovarium, placed on the centre of the calyx, of a short stylus placed towards the top of the ovarium, which takes a lateral direction, and of a bristling stigma (*stigmaté herissé*).

FRUIT.

The fruit is of the leguminous kind, about two inches long and two lines broad, flat at first, and almost cylindrical, when full ripe. It terminates in a small point arched outwards. It opens into two valves or husks (*battans*) from one end to the other, and contains five or six spherical grains of a dark grey, between which there is no line of separation.

INTERNAL FRUIT.

From the same plant proceed, towards the upper part of the root, one or more flat, white, and transparent filaments, which without either

ther ascending or descending, being usually two inches below the surface of the ground, spread horizontally, creep on, turn to the right and left, and form different angles, if they meet with any impediments in their way.

These filaments, which are different from the root and radicles in size, whiteness, flatness, and direction, become about seven or eight inches long, and half a line in breadth. If they subdivide, which seldom happens, the subdivisions are but single.

Through the whole of these filaments or sprigs one can perceive only some supports, and vestiges of an unobservable fructification, which could not be supposed to exist, did it not appear afterwards. These supports or stipulae, placed at unequal distances, are much smaller than those of the pedicles of the external plant; they are but very minute appendages, sometimes entire, and at other times indented, forming juts more or less apparent.

The point of the sprig is incurvated inwards, and at the end of it grows an embryo, around which are observed some foliaceous appendages, that have rather the appearance of supports than of leaves. When the sprig is single, there is usually but one embryo, and, should there be two, one of them is at the end, and the other holds by a lateral filament. On examining
with

with a magnifying glass this rising fructification, the traits of which are otherwise imperceptible, we discover something like a calyx with its divisions, but we perceive neither corolla nor stamen ; and in this calyx is found a germ terminated by an incurvated stigma, and bristled with small points.

This germ in its growth acquires every appearance of a leguminous fruit. Arrived at maturity it becomes round, and swells ; and then it is about three lines long and two broad. It is composed of two pale husks, in which is usually found only one spherical grain of a purple colour at first deep, afterwards fading, and seldom two.

These two husks, being shut up in the ground, remain united in consequence of their being compressed, and become dry round the seed or grain, the insertion of which in the placenta is placed at the dorsal edge of the husks, the two skins of which, that cover the cotyledons and the radicle, are similar as to position and form. As to the grain, it differs from those of the upper plant only in number, size, and colour ; the subterraneous fruit containing only one, or at most two purple grains, whereas in the upper one there are five or six of a greyish colour, and by one half smaller than the former.

The

The difference is greater in the pods than in the grains or seeds ; the external pod gains in length what the other does in breadth, and the latter, pale and discoloured, is incurvated inwards, while the other, preserving its verdure, is incurvated outwards.

This plant grows on the most sterile hills of the South of France, amidst the brambles, in every situation. It was first discovered in the island of Candia, and afterwards in the territory of Montpellier. In places susceptible of cultivation, or where the soil has been improved, it resembles externally, almost in every respect, cultivated vetches.

In this state it becomes the pest of the ground, because it is very difficult to extirpate it totally, and a thread of a filament with an embryo annexed would be sufficient to produce it. It is annual, blooms in May, and produces fruit in June ; but the subterraneous fruit ripens later than the external one.

In describing this species, we have had in view only such plants as grow in places, that are uncultivated or absolutely sterile ; for it be planted in ground not quite sterile, its stem becomes more than a foot long, and then it appears just like cultivated vetches.

From what has been said it appears, that this plant belongs to the class of leguminous plants,
whose

whose corolla is papilionaceous ; that out of ten stamens nine are united together ; that its pod has but one cavity without any partition ; and that in fine it belongs to the genus of vetches, the characteristic of which consists in having a tubular calyx with five equal divisions, a bristling stigma (*stigmaté hérissé*), a cylindrical pod, and winged leaves.

The species of this genus, that have eared flowers and perennial roots, are different from this one, which comes near to the other species, whose flowers are single, and whose roots die every year. But this approximation does not exclude the essential difference, on which is founded its specific characteristic peculiar to itself, consisting in its subterraneous fructification.

Excepting that difference, if we compare it with the common vetch there is scarcely any indication of a diversity between those two species ; for the two flowers, that are often found on cultivated vetches, are owing only to human industry, without which they would naturally produce but one at each wing.

Add to this, that those subterraneous sprigs, those commencements of fructification, in which no male organ is discovered, are such merely by accident ; for their not having leaves, and the imperceptibility of the corolla and stamens, are owing to their remaining under ground ;

ground; whereas if they get into the open air, the sprigs become branches adorned with leaves, which are succeeded by very visible flowers.

If this plant be on a declivity, liable to be uncovered by the rain, or if it grows in a loose soil that has some crevices, there are observed all around the lower part of the stem some small flowers, half white and half blue, that seem to be spread on the ground, and within them are found both male and female organs.

Therefore the alteration, that a part of this plant undergoes, is to be attributed only to a difference of situation; but as this situation is peculiar to itself, it must be allowed that, from this very circumstance, it constitutes a particular species different from the common vetch.

In every other respect there is scarcely any thing, in which those two species do not agree, and the affinity between them is still more apparent at the first shooting of the seed. What I have said with regard to the form, &c. of the leaves when growing is equally applicable to both, nor have I remarked any other difference but a delay of seven or eight days in the shooting of the species in question, which delay may be attributed to the more sterile and less sheltered situation, whence must result seeds, that are more slowly developed, because wild products contract a greater degree of hardness.

COUNTY REPORTS
OF
IMPROVEMENTS.

IRELAND is daily improving in Agriculture, Husbandry, Arts, and Sciences, but, these improvements being chiefly local, the knowledge of them is kept from the public in general.

It is to be wished, that such improvements were made known to the *Dublin Society* by each individual making the improvement, or by some patriotic neighbour. Such information might be formed into one Report by the *Society*, and published annually in their Transactions, which might cause emulation in some, and give satisfaction to others.

The following Note of the various measures calculated for the improvement of the county of Caithness carrying on in 1801, communicated to the *Society* by Sir John Sinclair, will serve as an example.

A NOTE OF VARIOUS MEASURES,

CALCULATED FOR THE

IMPROVEMENT

OF THE

COUNTY OF CAITHNESS,

CARRYING ON, ANNO 1801.

1. Mr. Headrick, and Mr. Bushby the Mineralogical Surveyor, have been sent north, by the Barons of Exchequer in Scotland, to bore for coal at *Scrabster*, in the neighbourhood of *Thurso*, on lands belonging to the Crown, where there is a great probability, that a very valuable mine of coal will be discovered.
2. Mr. Telford, a respectable and intelligent engineer, has received orders from the Treasury, to survey the harbours on the coast of *Caithness*; in particular, those of *Wick*,

Wick, Thurso, and Dunbeath; and to estimate the expence of making the same.— Some public assistance may be expected for carrying on these important undertakings; in the promotion of which, the Directors of the British Fishing Society, and Mr. Vansittart, Secretary to the Treasury, have much interested themselves.

3. For the purpose of improving the fisheries on the coast of *Caithness*, Government has sent north, free from expence, some Dutch fishermen, to be employed in the herring fishing at *Wick*.
4. Mr. Charles Abercrombie, so celebrated for his skill in lining out roads, has received orders from Lieutenant-General Vyse, authorised for that purpose by Lord Pelham, Secretary of State for the Home Department, to line out the roads, about the *Ord*, and hills of *Berridale*, and along the borders of *Caithness* and *Sutherland*, so as finally to settle the direction, throughout a tract of country, which is reckoned the most difficult to make of any in Scotland.
5. Application is made to government for authority to lay out a sum of money, this year, in making the roads of the county, to be repaid out of the balance of the for-

feited estates in Scotland; with a view, not only of carrying on so essential an improvement, but also of furnishing a number of industrious labourers with the means of subsistence.

6. A person from Perth, well acquainted with the Linen trade, has examined, in the course of this year, the advantage which Caithness possesses for carrying on that manufacture; and has placed them in so striking a point of view, that no doubt is now entertained of its being soon established on a large scale in the county. Some flax is already raised, and great quantities of yarn spun, wove, and bleached, to as great perfection as in any part of Scotland.
7. When the harbour of Dunbeath is made, it is proposed to carry on a regular intercourse with the opposite coast of Moray and Banff, for the purpose of importing lime from Portsoy, &c. and for exporting cattle, too large for sending round by the heads of the Friths, or in too good condition to be driven to any great distance, through a rugged country.
8. A number of farmers from the Lothians, and other southern counties, have been examining

examining the farms in Caithness, where it is supposed that several of them will settle. They have every inducement to do so, as the crops in Caithness were abundant for the two last years, when they failed in so many other districts.

9. Robert German, from the county of Cambridge, has come to Caithness, with the peculiar sort of ploughs, adapted for trying the fen husbandry, as practised in Lincolnshire, Cambridgeshire, &c. This is the most profitable of all farming ; producing, at a small expence, great crops of grain, grafs, rape, tares, turnips, &c. by paring and burning mossy lands, not worth, in their present state, a shilling *per* acre. There is every reason to hope, that this important improvement will answer, equal to the most sanguine expectations of those by whom it has been introduced.
10. Mr. Stephens, junior, proposes being in Caithness in October, to examine to what extent watering of land, and draining, can be carried on in the county ; that such essential improvements may be pursued, with proper spirit, in the course of next season.
11. The Resolutions adopted by the gentlemen of the county, last year, for establishing
winter

winter herding, preventing the casting of feal and divot, and including other branches of police, have already had so beneficial an effect, that it is resolved to enforce them as much as possible. Indeed, all the intelligent farmers in the county are so sensible of the advantages resulting from them, that it is hoped no compulsory measures are necessary, to insure their observance.

12. Mr. Scott, a respectable builder from Edinburgh, is employed in erecting houses in the new town of Thurso. He has discovered a very valuable free-stone quarry in the neighbourhood, which will be of the utmost service in promoting the building of that town; and it may become an article of export to London, and other places, being of an uncommon good quality. The town of Thurso now contains about 2000 inhabitants; and has increased about 400 within the last ten years.
13. The trees, which have been planted in the hilly parts of the county, promising to answer, it is proposed to carry on plantations there on an extensive scale, and to establish nurserymen, by whom the gentlemen of Caithness may be supplied with young trees, accustomed to the soil and climate, and consequently

requently more likely to thrive than any that can be imported.

14. Some promising veins of copper, and of lead ore, and specimens of the most beautiful marble, having been discovered in different parts of *Caithness*, Mr. Hutchinson, of Alstonmoor, in Cumberland, came north to examine them ; and is so much pleased with their appearance, that he intends, in conjunction with his friends, to establish a company for working such as are likely to be the most productive and valuable.
15. The introduction of the Cheviot breed of sheep has succeeded so completely, that it is proposed to increase them considerably. The flock of one proprietor already amounts to between 3000 and 4000 ; and he proposes augmenting the number to 10,000, which will probably be the largest flock, of so valuable a sort, in the island. Materials will thus be furnished for the establishment of a woollen manufacture, which has been long much wished for.
16. Though sheep must be the staple article in the hilly districts, yet cattle ought to be principally attended to in the plain country, until there is a market for considerable numbers

numbers of fat sheep. The cattle of *Caithness* are much improving in quality, particularly those which have been crossed with the *Galloway breed*. In order to accommodate the drovers, who may wish to purchase them, and that the cattle may be brought to their proper value, it is proposed to hold stated fairs, in the beginning of the months of June, August, and September, which several considerable dealers have already engaged to attend.

17. A regular and frequent communication with other places is essential to the improvement of any district. To obtain that advantage for *Caithness*, it is necessary that a daily post should be established to the two principal towns; and it is to be hoped, that an intended application to the Postmaster General for that purpose will be successful. It is farther proposed, to have packets or vessels, that will sail, at fixed periods, from *Leith* to the towns of *Wick* and *Thurso*; and also to carry on an intercourse with the metropolis, by means of the fishing smacks, which supply the London markets with cod and other fish, and which rendezvous, for several months in the year, at *Scrabster Road*, near *Thurso*.

18. Instead of applying, either to Courts of law, or to Parliament, for authority to divide the commons, it is not unusual, at present, to refer the same to the decision of one or more gentlemen of the county, who are not interested in the division; and so much are the proprietors, in general, disposed to promote such measures, that a favourite toast here is likely soon to be realized—"May a *common* be an *uncommon* spectacle in Caithness.
19. The late scarcities have pointed out the necessity of improving the agriculture, and extending the cultivation of the kingdom. In regard to the latter point, there is every reason to hope, that the county of *Caithness* will not be deficient. A great extent of waste lands have been improved, this year, in various parts of the district; and the crops promise amply to repay the expence, more especially on mossy lands. The spirit of inclosing and cultivating wastes is now so prevalent, that one gentleman has pledged himself, that he and his tenants shall improve five hundred acres in the course of next year; and a Subscription paper is proposed, to ascertain the quantity, which the different proprietors of the county will undertake to improve, in the course of next season.

20. As education is the basis of all permanent improvement, it is intended, immediately, to erect an academy at *Thurso*, where all the principal branches of education will be taught by proper masters. A boarding school for girls has already been established there, and is conducted much to the satisfaction of the town and neighbourhood; and as *Thurso* will soon rival, in regard to the important article of education, any town of its extent in Scotland, that, joined to the cheapness of provisions, and other conveniences, must be a great inducement to persons of moderate income to settle there.

It will appear, from the preceding enumeration, what a variety of important improvements are now carrying on in *Caithness*, which the late favourable seasons, and the high price of the articles which the country produces, have greatly tended to promote. In the course of last spring, and summer, from 400 to 500 labourers came in from the neighbouring counties in quest of work; and hitherto they have all found occupation in building, inclosing, ditching, trenching, roadmaking, and other substantial improvements. Indeed, such has been the happy situation of *Caithness* during seasons, which have unfortunately borne

borne so hard on other places, that no person, either living in it, or who chose to come into it from any of the neighbouring districts, have felt the want, either of food or employment.

MESSRS.

MESSRS. COLLARD AND FRASER'S

PROCESS FOR PREPARING

THE WELD YELLOW*.

*From Mr. TILLOCH's Philosophical Magazine,
for September 1802. §. 53.*

THERE is not to be found, either in the vegetable or mineral kingdoms, any other substance, which yields so elegant a yellow colour as the *weld*, or, as it is written by some, *would*, or dyer's weed. The weld is of the *resedian* tribe, and is cultivated with care in Kent, Herefordshire, and many other parts of the kingdom. The principal consumers are dyers, calico-printers, and colour-makers. The plants are dried by the growers, tied up in parcels weighing from 30 to 50 pounds each, and are sold, to use the language of the trade, at so much a bundle.

This

* Communicated by Messrs. Collard and Fraser.

This is a very injudicious practice ; for it is the small seeds of the plant only which afford the colouring matter, a great portion of which are shaken out in the package, and even in moving the bundles from one place to another. Besides, the plant altogether occupies so much room, that the carriage of the useless stalks for a hundred miles, by land, amounts to more than five per cent. upon the article ; whereas the seeds in a quantity occupying a space of six feet square would by no means fill a half peck measure.

The weld yellow is a water-colour, principally used by paper-hanging manufacturers for elegant work. An oil colour has never been prepared from the weld. A preparation of weld yellow in oil would be a valuable acquisition ; for the patent oil colour, made from a very old *recipe*, by fusing the oxide of lead with the muriate of ammonia in the proportion of about one pound of the former to three ounces of the latter, appears as vile as brick-duft when compared to the weld yellow.

The weld yellow made in London is sold in hard lumps, and must be ground before it is fit for use. Now it is well known that every colour suffers, in some degree, by that operation. By the following process the most beautiful weld yellow may be prepared, which will fall into a fine powder, and will want no grinding.

Take

Take of pure carbonate of lime (fine washed whiting) any given quantity, *e. g.* let it be four pounds ; put it into a copper boiler, and add to it four pounds of soft water : put a fire under the copper and raise it to a boiling heat, and keep stirring with a deal stick till the whiting be completely divided, and forms with the water a consistence quite smooth. Then add for each pound of whiting three ounces of alum previously pulverized tolerably fine. The alum must be added gradually, and the operator should keep stirring with his deal stick during the administration ; for a double decomposition is effected, accompanied with effervescence, and carbonic acid is discharged. Thus, if the alum were not administered gradually, the boiler would overflow with the violence of the effervescence ; and, if the whiting were not well divided previous to the introduction of the alum, the distribution amongst the whiting would be unequal, and the colour would be injured. When the alum is all introduced, and the effervescence has ceased, the basis is properly prepared. The fire may be then drawn, and it may remain for any length of time without injury, till the other materials are ready. Having thus prepared the basis, take the welds, place them, with their roots uppermost, in another copper boiler, pour in
soft

soft water enough to cover every part containing seed, and let them boil not more than fifteen minutes : then take them out, place them, with their roots uppermost, in a tub to catch the liquor which runs from them, and pass the liquor in the copper, with what runs from the welds in the tub, through a flannel filter, to intercept the seeds and fæcula ; and thus the colouring matter is prepared.

It is impossible to say what quantity of welds should be employed to any given quantity of whiting, for some bundles will contain three times as much seed as others. It is well, however, to know that, if too much colouring matter be prepared, it may be kept in an earthen or deal vessel for many weeks, without sustaining any injury.

Having filtered a sufficient quantity of the weld liquor, put a fire under the boiler containing the basis, and add the weld liquor till the colour be obtained. When sufficient colouring matter is added to the basis, the fire should be raised to a boiling heat, and the work is finished. In order to be satisfied when the greatest strength of colour is obtained, for there is a *ne plus ultra*, take a little out on chalk, which will absorb the moisture instantly ; when it may be laid on paper with a brush, and viewed perfectly dry in a few minutes.

The

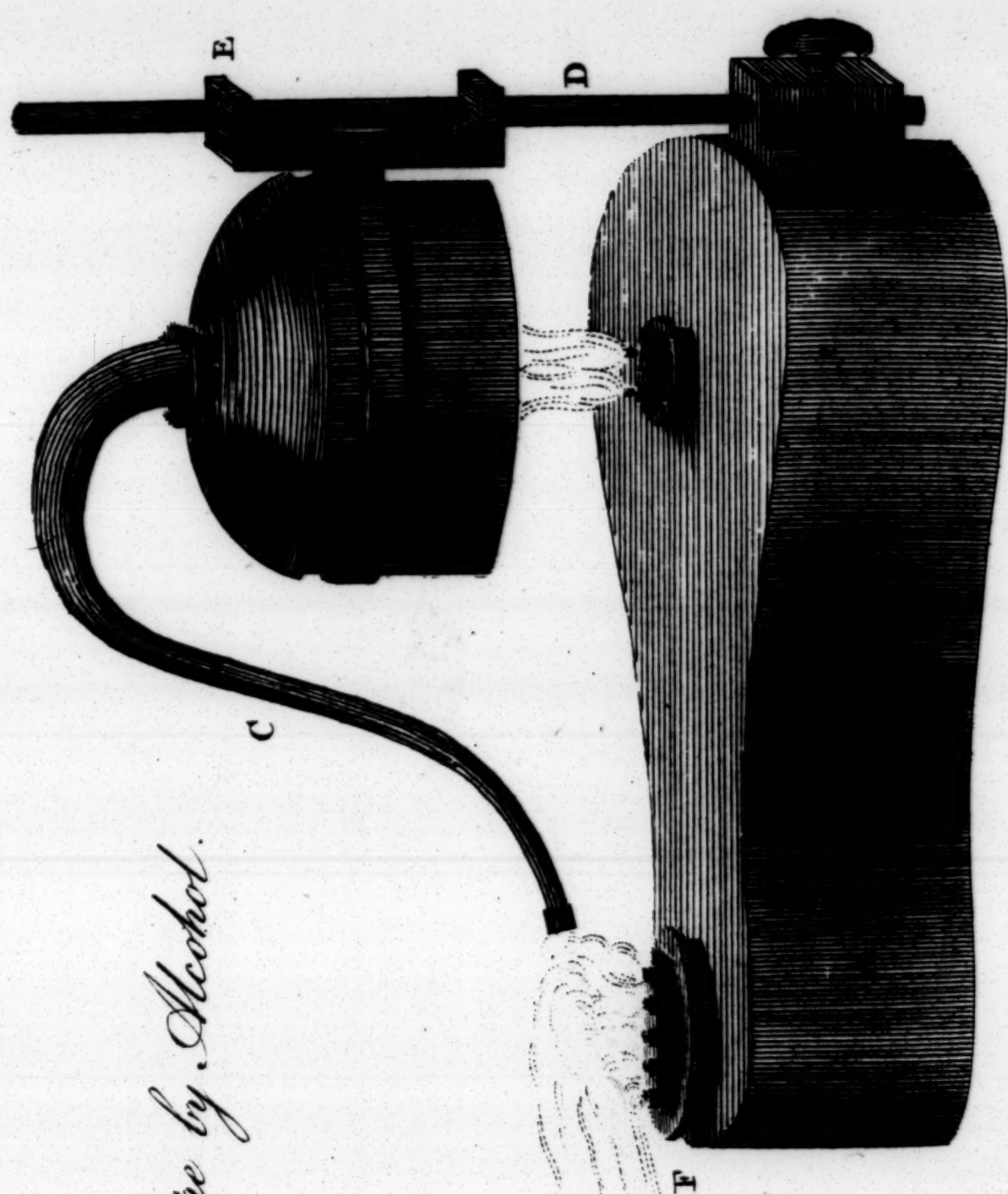
The contents of the furnance should be then put into a deal or earthen vessel to precipitate. The next day the liquor may be poured off, and the colour may be placed on large pieces of chalk, which in a few hours will absorb the moisture, and it will then be fit for use or sale.

The liquor poured off from the colour may, with the addition of water, be used again, and the old welds may be boiled a second time, and taken out previous to the addition of fresh welds, so that no colouring matter will be lost.

In the preceding process, the greatest care should be taken that no iron be suffered to come in contact with the colour ; for the gallic acid or astringent principle, which eminently abounds in this vegetable, will instantly dissolve iron, and the smallest particle of that metal is fatal to the delicacy of the weld yellow.

DESCRIPTION

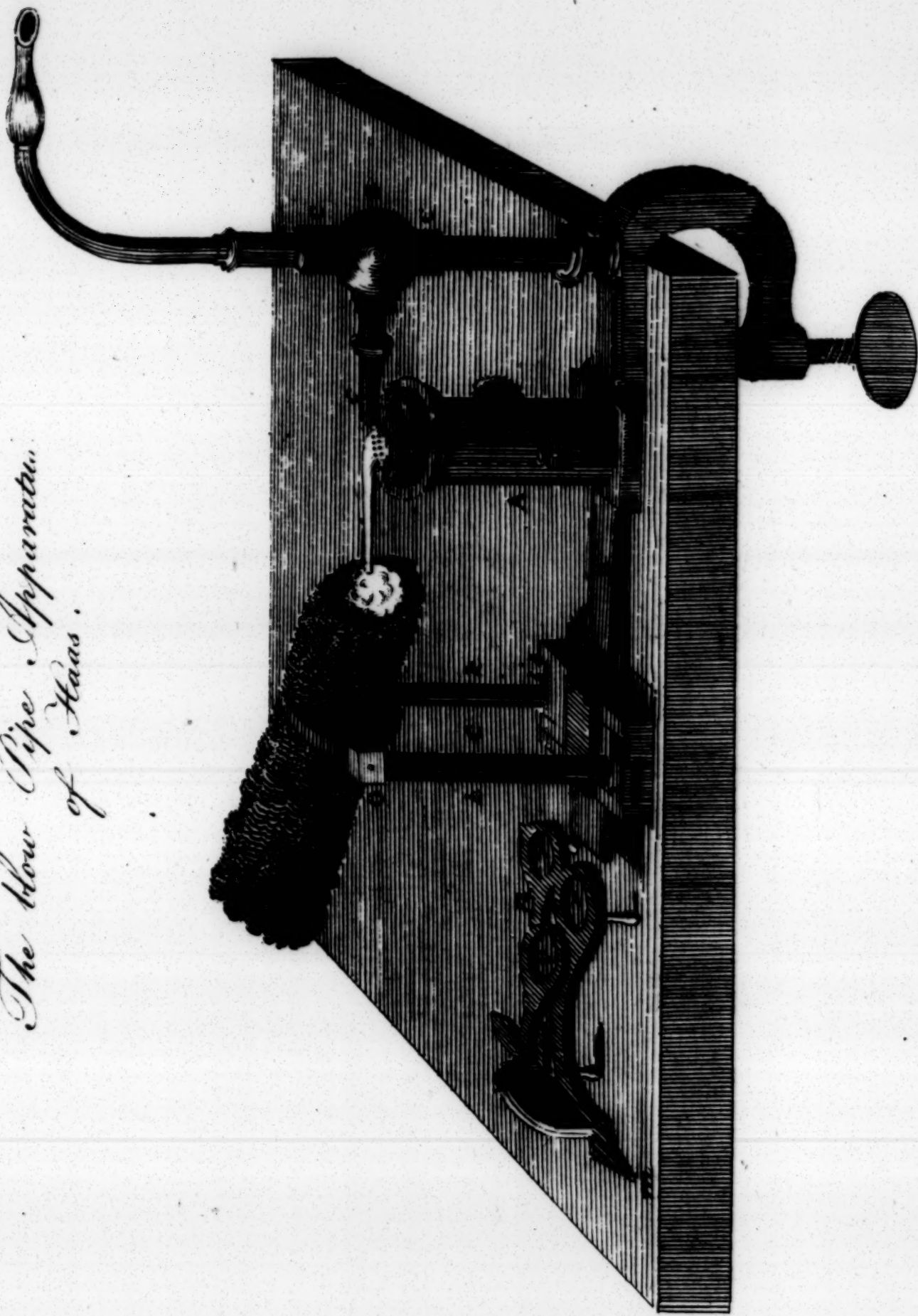




Blow-pipe by Alcohol.



*The Blow Pipe Apparatus
of Haas.*



DESCRIPTION

OF A

CHEAP AND SIMPLE

APPARATUS

OR

BLOW-PIPE,

IN WHICH THE FLAME OF OIL OR TALLOW IS IM-
PELLED BY THE VAPOUR OF ALCOHOL.

*From MR. NICHOLSON'S Journal of Natural
Philosophy, &c. No. 9.*

TO MR. NICHOLSON.

SIR,

London, July 9, 1802.

USEFUL as the *blow-pipe* is for the professed mineralogist and chemist, as well as for the amateur of the science, it is, however, liable to the inconvenience of requiring one hand of the operator to be employed ; besides, that persons of weak lungs, or not well accustomed to its use, find it laborious, even when they attempt to manage it according to the directions given by Bergman and Engstrom ; more especially, when a continued stream of air is required for

F

some

some time. For this reason, some have recourse to a *bladder* filled with air, and force it out by pressing the bladder between the arm and their body ; others use a small pair of *double bellows*, to be fixed upon the table : others again employ a receiver, or rather *gazometer*, in the form of Mr. Watt's hydraulic bellows. But all these means are not always ready at hand, or not easily portable to accompany the travelling mineralogist, and in every case they require some preparation. And even the ingenious contrivance of Mr. Haas, though it permits the free use of the operator's hands, is expensive, and still requires the blowing through the mouth.

When Professor Pictet of Geneva visited London last year, he brought with him and exhibited to his friends an apparatus, which at the same time, that it is simple and very portable, is the most advantageous substitute for the blow-pipe, and removes all its inconveniences. An imitation of this apparatus was exhibited in the lecture-room of the Royal Institution, Albemarle-street.

The drawing of this instrument, which I subjoin, was copied from that communicated by a friend. A, plate E, is a tin box filled with common oil, serving to feed the flame at F, thence to be directed on the substance under
exami-

examination, and at the other flame, to heat the spirit of wine contained in the copper or tin lamp B. The boiling spirit, being converted into steam by the heat, rushes through the bended tube C upon the flame of the wick at F. Lastly, D is a slider with loops and screws to raise or lower the spirit lamp. The whole being very simple and clear, any farther explanation would be needless.

I do not know whether Professor Pictet pretends to be the inventor of this apparatus; but certain it is, that Abbe Nollet more than fifty years ago employed such a contrivance, as may be seen in his *l'Art de faire Experiences*. Another application of the spirit lamp for this purpose I have read in the *Annales de Chimie*, but do not recollect in which volume.

There is no doubt but the communication of the lamp above described will be acceptable to many of the readers of your excellent Journal; whence, if you agree with me in this opinion, be so kind as to insert it.

I am, Sir,

Your humble servant,

N. N.

ANNOTATION. W. N.

The application of the elastic and combustible vapour of alcohol to this useful purpose is so obvious, that it can scarcely be appropriated as an invention. The glass-blowers have long fold a little implement, consisting of an egg-shaped ball, having a stem or handle, and a nozzle or tube. It is an eolipile, and when half filled with water or spirit, and heated over a candle, a strong current either of vapour or of the dense fluid will issue out accordingly as it is held. With the vapour of spirit thus blown through the large flame of a tallow lamp, I fused a halfpenny, and softened the stopper of a bottle so as to run a wire through it; though I must confess not without apprehension of the thin brittle vessel bursting, and covering the surrounding bodies with flame. The lamp B, which is the essential part, may be made cheap; and indeed the whole would cost but a trifle. I took a small lamp of that figure, $2\frac{1}{2}$ inches wide and $1\frac{1}{2}$ inch high (of the sort called *agitable*, from the cap for the wick being made to screw in and defend the oil), and in the place of the wick-pipe, I soldered a piece of a common blow-pipe. The lamp cost eighteen pence, and the blow-pipe six-pence, and the combination answers perfectly well.

DES-

DESCRIPTION
OF THE
BLOW-PIPE APPARATUS OF HAAS.

From MR. NICHOLSON'S Journal, &c. No. 10.

TO MR. NICHOLSON.

DEAR SIR,

AFTER I had communicated to you the apparatus for the blow-pipe by means of alcohol, as used by Professor Pictet, which you favoured with a place in the last number of your excellent Journal, I was struck with the idea that the apparatus of Mr. Haas, which I mentioned in my letter, though made in the midst of London, is almost entirely unknown in this country. As this last is very ingenious, and affords many advantages in the use of the blow-pipe, I think you will render a service to your chemical readers by making them acquainted with its nature and construction. In consequence of
this,

this, I here subjoin a description and drawing of it, given by Mr. Orstein in Dr. Scherer's Chemical Journal, Vol. II. page 454. I leave it to your discretion whether you think it, deserving a place, and continue with the highest esteem,

SIR,
Your most humble
and obedient,
N. N.

P. S. Concerning the older constructions of the blow-pipe, Dr. Scherer refers in that paper to Bergman's Opusc. II. Engström's description of a mineralogical pocket laboratory (which may be seen in the second volume of Magellan's translation of Cronsted's Mineralogy, 8vo, Lond. 1788), and to Weigel's Versuch einer Geschichte, Essay towards a history of the blow-pipe, and its use, in Crell's addition to the Chemical Annals, Vol. IV. page 262—283, and page 393—419 ; also, Vol. V. page 6—24, and page 198—226.

THE delineation here added is upon the whole so distinct, that a few parts only require a detailed description. I begin with the candle tube, as it is the most essential part of this apparatus, on which all the others in some manner depend.

Plate

Plate F. A is this candle-tube, which may be slid backwards and forwards upon the plate B. The rack in the tube serves to raise the candle. The ball *s*, together with its tubes *cc*, may also be raised and lowered in order to direct the point *e* accurately towards the flame. The possessors of this apparatus will undoubtedly thank Mr. Haas for the ingenious arrangement of the inner parts of the ball, by means of which no moisture can enter into the point *e*.

The charcoal-stand C is likewise moveable upon B; but at the same time, as the drawing shews, its pillars *k k* are likewise, by means of the sliding-pieces *i i*, capable of a lateral motion; besides that at *o* the coal can be vertically turned upon the pillars.

The construction of the snuffers, and the rectangular situation of their point *m* with their flaps to the handle *n*, will be found particularly important and useful. For, by reason of this form, the wick can, without any inconvenience to the hand, be always cut off in the same direction in which the flame is blown, and by stroking the wick with the point *m* (turned towards the body of the operator), it may be so managed as to be always kept broader in the direction of the flame. This will be found more expedient than the usual method of bending the wick according to the flame's direction.

The

The handle is laid hold on with the thumb and middle finger at *r r*. The fore-finger, for the purpose of snuffing the candle, opens or shuts the moveable flap by pushing the piece *V* to the right or left. It is because a common pair of snuffers, in the use of this apparatus, would be not only extremely incommodious but even detrimental, that Mr. Haas invented this commodious and useful instrument.

The following articles, which make this apparatus complete for use, were sold by Mr. Haas* in a neat box: 1. Various candles; 2. Points of different bores; 3. A hammer; 4. A round excavated piece of steel to pound the products of the operation; 5. A pair of tongs; 6. A file; 7. A knife; 8. A magnifying lens; 9. A spoon made of platina; 10. A steel to strike fire, serving at the same time as a magnet; 11. A quadrangular magnet bar; 12. A thermometer; 13. A hydrometer.

* Mr. Haas is no longer in London: Five sets of this apparatus were sent to Portugal, where he is now established. The blow-pipe and rest of the adjutage are made of brass, except the snuffers.—Transl.

ON
FEEDING SHEEP ON POTATOES.

*From a Pamphlet lately published by MR. BARTLEY,
Secretary to the Bath Agricultural Society.*

THE crop of potatoes last year was abundant to excess, at least as for human sustenance ; the probable consequence will be a waste, at the end of the season, of many thousand tons, as formerly has been experienced in some very plentiful seasons.

In the bulb form, there seems to be no method of preserving them over the season.

This consideration operates forcibly to check a regular and spirited cultivation ; hence may be deduced the extreme variation in prices, which is known to have been from two shillings per sack (224 lb.) to upwards of twenty ; the latter extreme must have been felt most severely by the labouring poor.

Many

Many attempts have been made to remedy this partial inconvenience, which appears to me the only let to an unlimited culture.

R. Bright, Esq. of Hampne-Green, near Bristol, whose attentive mind is directed to the pursuits of agriculture, by motives of public utility, discovered about the year 1795 a process, whereby to preserve potatoes in a fit state for culinary purposes, during a voyage to and from the West-Indies, and for years after.

In general terms, his method was this—To dress the potatoes as usual by steam, to crush them a little by pressure, and then to discharge the remaining moisture by the heat of a stove, not exceeding the 86th degree on Fahrenheit's thermometer. This method would be well applicable for long sea voyages, and other useful purposes.* A more general method, and which perhaps might also embrace the other, would be, as I conceive, to extract the flour, starch, or farina. And I strongly conjecture, that hereafter it will be a method occasionally resorted to on something of an extensive scale.

But

* With this additional and important advantage, that the superfluity of moisture being thus discharged, the nutritious part only would remain, reduced in volume or weight about three-fourths of the bulb itself; in this compressed state, perhaps, it would be nearly equal in nutritious effect with wheat flour, weight for weight.

But I imagine the most economical, certainly the most compendious mode of applying any surplufage would be in feeding cattle and fheep, with preference to the latter ; and indeed, according to my obfervation, they feed on the potatoe with a greater degree of avidity than the others ; but it ought to be obferved, that, as at a new article, they will hesitate a little in the firft inftance, and fometimes for two or three days.

About fifteen or fixteen years ago, a large crop of potatoes was experienced, I mean by comparifon with the then very limited confumption in this part of the kingdom ; however, I had planted a confiderable breadth of ground ; upwards of 700 facks of the produce were fold and delivered at a diftance of three miles for two fhillings per fack ; ftill a very large quantity remained not to be fold at any price ; this induced me to try them in feeding twelve working oxen I then had of the Devon kind. They were fed through the following winter, in the farm-yard, entirely on potatoes and barley ftraw. They had confumed the whole of the potatoes by the latter end of April, and were fo much improved in condition, as to draw the wondering attention of the farmers in the neighbourhood ; in fhort, they were in that plight, which a butcher would term *half-fat*.

The

The potatoes were given raw and unwashed, in which manner I have in every instance applied them, excepting to fattening pigs.

About this time, also, I accidentally discovered that sheep were excessively fond of potatoes; some of them were constantly strewed about in the home leaze, for the use of the store-pigs; my sheep on some occasion were brought there from other pasture; it was soon observed they began to feed on the potatoe, which was encouraged, and my whole flock, thenceforward, regularly fed on them as long as they lasted, with evident shew of advantage.

The circumstances of the present season, similar in degree to that I have mentioned, but abundantly higher in amount, brought to my attention the facts before stated.

In consequence, towards the middle of February last, I began to feed in this way a small flock of ewes, partly of the Spanish and Ryland, and partly of the Spanish and Wiltshire admixtures, both then in lamb by my Lord Somerville's native Merino tups.

In the course of a few days, the shepherd brought me word they took to the potatoes with an astonishing degree of eagerness; astonishing to him it might have been, yet I had assured him of the event, but he was so incredulous at first, that observing the potatoes to
remain

remain in the field untouched for two days, he plainly told me he had given the thing up in his own mind as a lost scheme.

He has continued to feed them regularly every morning, in the proportion of about $2\frac{1}{2}$ lb. to each ; they would readily take much more, but I fear to endanger their lambing, they improve in condition, so rapidly. As the lambs drop, they are supplied more liberally to increase the milk ; they are of a size to weigh, when well made out, from 14lb. to 16lb. the quarter.

The shepherd is now highly gratified in his employment to serve them ; he has but to announce himself by a call or whistle, and they troop up to him full speed. They will take the potatoes from out of his hand. One of the Ryland mixture in particular, he imagines, in equal times, would consume double the quantity of any of the others, such is her eagerness. I consider her now to be *thick-fat* ; but with the others, when I received them in September last, was *stark-poor*. According to Mr. Bakewell's definition of beauty, she is, as I think, an animal of the most exquisite symmetry.

This practice will become general, wherever it is known. Within the reach of my own observation, I can say, that some thousands of sheep are already thus feeding.

The

The advantage is real and substantial, *at least* under the existing circumstance of a prodigious surplus of the article adverted to ; but in what proportion or degree remains to be investigated and appreciated, and certainly it seems to be a consideration of the highest interest and importance.

It would possibly result from well conducted inquiries of this nature, that the potatoe might generally be well substituted for the turnip. The crop is less precarious, suitable to a greater variety of soil, and with more certainty to be secured against the severity of frosts, by which the latter, not unfrequently, suffers to an alarming degree. Besides, in those parts of the kingdom where the practice of hoeing is neglected, turnip crops are but of small comparative value ; whereas, to obtain tolerable crops of potatoes is understood in all quarters.

In my MS. paper on the culture of potatoes, I have ventured to advance an opinion, that 224lb. of potatoes would be equal in nutritious effect to a bushel of wheat, and I firmly persuade myself, that I am not incorrect when we advert to the most farinaceous kind, viz. such as contain about one-fourth part flour. But I will suppose, that a sack of potatoes is only equal in value to a bushel of oats,
on

on which sheep are not unfrequently fed, and it seems a fair presumption, that they are found to pay for their feed. But I incline to contend, that 200 sacks of potatoes are easily attainable from an acre of land, equal in value, on this assumption, to 200 bushels of oats !

Bath, April 18, 1802.

To

TO
GENERAL VALLANCEY, V. P.
OF THE
DUBLIN SOCIETY.

SIR,

THE study of Mineralogy having become almost general in this country of late years, and particularly with the members of the Dublin Society, it may not be disagreeable to lay before them what has been written on certain stony and metalline substances, which at different times are said to have fallen on the earth.

THIS essay was published in the Transactions of the Royal Society of London, for 1802, and reprinted in the Philosophical Magazine, by the ingenious and learned Mr. Tilloch; to which I have added the abstract of a Memoir, lately read at the Philomathic Society at Paris.

A MEMBER.

EXPERIMENTS AND OBSERVATIONS

ON CERTAIN

STONY AND METALLINE SUBSTANCES

*Which at different Times are said to have
fallen on the Earth; also on various
kinds of Native Iron.*

By EDWARD HOWARD, *Esq. F. R. S.*•

THE concordance of a variety of facts seems to render it most indisputable, that certain stony and metalline substances have, at different periods, fallen on the earth. Whence their origin, or whence they came, is yet, in my judgment, involved in complete obscurity.

The accounts of these peculiar substances, in the early annals, even of the Royal Society, have unfortunately been blended with relations, which we now consider as fabulous ; and the more antient histories of stones fallen from
G
heaven

* From the *Transactions of the Royal Society of London* for 1802.

heaven, from Jupiter, or from the clouds, have evidently confounded such substances with what have been termed *ceraunia*, *bætilia*, *ombria*, *brontia*, &c. names altogether inappropriate to substances fallen on our globe. Indeed some mislead, and others are inexpressive.

The term *ceraunia*, by a misnomer, deduced from its supposed origin, seems, as well as *bætilia**, to have been antiently used to denote many species of stones, which were polished and shaped into various forms, though mostly wedge like or triangular, sometimes as instruments, sometimes as oracles, and sometimes as deities. The import of the names *ombria*, *brontia*, &c. seems subject to the same uncertainty.

In very early ages it was believed that stones did in reality fall, as it was said, from heaven, or from the gods; these, either from ignorance, or perhaps from superstitious views, were confounded with other stones, which, by their compact aggregation, were better calculated to be shaped into different instruments, and to which it was convenient to attach a species of mysterious veneration. In modern days, because explosion and report have generally accompanied the descent of such substances, the
name

* Mercati, *Metallotheca Vaticana*, p. 241.

name of thunderbolt, or thunderstone, has ignorantly attached itself to them ; and because a variety of substances accidentally present near buildings and trees struck with lightning have, with the same ignorance, been collected as thunderbolts, the thunderbolt and the fallen metalline substance have been ranked in the same class of absurdity. Certainly, since the phænomena of lightning and electricity have been so well identified, the idea of a thunderbolt is ridiculous. But the existence of peculiar substances fallen on the earth, I cannot hesitate to assert ; and on the concordance of remote and authenticated facts I shall rest the assertion.

Mr. King, the learned author of “Remarks concerning Stones said to have fallen from the Clouds, in these days, and in antient times,” has adduced quotations of the greatest antiquity, descriptive of the descent of fallen stones ; and, could it be thought necessary to add antique testimonies to those instanced by so profound an antiquarian, the quotations of Mons. Falconet, in his papers upon *boetilia*, inserted in the *Histoire des Inscriptions et Belles-Lettres** ; the quotations in Zahn’s *Specula Physico-mathematica Historiana*† ; the *Fisica Sotterranea* of

G 2

Giacinto

* Tom. vi. p. 519, et tom. xxiii. p. 228.

† Fol. 1696, vol. i. p. 385, where a long enumeration of stones fallen from the sky is given.

Giacinto Gemma ; the works of Pliny, and others, might be referred to.

Dr. Chladni, in his "Observations on the mass of Iron found in Siberia, and on other masses of the like kind," as well as in his "Observations on Fire-balls and hard Bodies fallen from the Atmosphere," has collected almost every modern instance of phenomena of this nature.

Mr. Southey relates an account, juridically authenticated, of a stone weighing ten pounds, which was heard to fall in Portugal, Feb. 19, 1796, and was taken, still warm, from the ground*.

The first of these peculiar substances, with which chemistry has interfered, was the stone presented by the abbé Bachelay to the Royal French Academy. It was found on the 13th of Sept. 1768, yet hot, by persons, who saw it fall. It is described as follows†:

"The substance of this stone is of a pale ash-gray colour ; when examined with a magnifying glass, it is found to be interspersed with a multitude of small brilliant metallic points of a pale

* Letters written during a short residence in Spain and Portugal, page 239.

† Here, and in the two following quotations, Mr. Howard gives the original words of the author : we have substituted faithful translations. — EDIT.

pale yellow colour ; its exterior surface, that which, according to the abbé Bachelay, was not engaged in the earth, was covered with a small and very thin stratum of a blackish matter, puffed up in some places, and which appeared to have been fused. This stone, when the interior of it was struck with steel, produced no sparks : on the other hand, when struck on the thin external stratum, which appeared to have been attacked by fire, some few sparks were elicited."

The specific gravity of this stone was as 3535 to 1000.

The academicians analysed the stone, and found it to contain

Sulphur	-	-	$8\frac{1}{2}$
Iron	-	-	36
Vitrifiable earth	-	-	$55\frac{1}{2}$
			100

Of their mode of analysis, I shall have occasion to speak hereafter. They were induced to conclude, that the stone, presented to the academy by the abbé Bachelay, did not owe its origin to thunder ; that it did not fall from heaven ; that it was not formed by mineral substances, fused by lightning ; and that it was nothing but a species of pyrites, without peculiarity, except as to the hepatic smell disengaged

ed from it by marine acid. "That this stone, which was, perhaps, covered by a small stratum of earth or turf, may have been struck with lightning, and thus uncovered: the heat may have been sufficiently great to fuse the surface of the part struck, but it may not have been long enough continued to be able to penetrate to the inside: on this account, the stone has not been decomposed. The quantity of metallic matters it contains, opposing less resistance than another body to the current of the electric matter, may perhaps have contributed to determine the direction of the lightning."

The memoir is however concluded, by observing it to be sufficiently singular, that M. Morand le fils had presented a fragment of a stone, from the environs of Coutances, also said to have fallen from heaven, which only differed from that of the abbé Bachelay because it did not exhale the hepatic smell with spirit of salt. Yet the academicians did not think any conclusion could be drawn from this resemblance, unless that the lightning had fallen by preference on pyritical matter*.

Monf. Barthold, professeur à l'école centrale du Haut-Rhin, gave, I believe, the next, and
last

* See *Journal de Physique*, tom. ii. p. 251.

last*, analytical account of what he also denominates *pierre de tonnerre*. He describes it thus:—"The mass of stone known under the name of *pierre de tonnerre d'Ensisheim*, weighing about two quintals, has its exterior form rounded, almost oval, is rugged, and of a dull earthy appearance.

"The ground of the stone is of a blueish gray colour interspersed with insulated crystals of pyrites, the crystallization of which is confused, in some places scaly, accumulated, forming nodes and small veins, which traverse it in every direction: the pyrites is of a golden colour: polishing gives it the splendour of steel, and, when exposed to the atmosphere, it becomes tarnished and brown. One may distinguish also with the naked eye gray scaly iron ore, not sulphureous, susceptible of being attracted by the magnet, little oxidated, or approaching much to the metallic state.

"The fracture is irregular, granulated, of a grain somewhat compact: in the inside very small fissures are seen. It does not strike fire with steel: its texture is so soft, that it readily suffers itself to be attacked by a knife. By pounding, it is easily reduced to a blueish gray powder

* A very interesting detail of a meteor, and of stones fallen in July 1790, was given by professeur Baudin in the *Magazin für das Neueste aus der Physik*, by professor Voigt.

powder of an earthy odour. Sometimes there are found small crystals of iron ore, which present a greater resistance to the blows of the stamper."

The specific gravity of the piece in professor Barthold's possession was 3233, distilled water being taken at 1000.

The analysis of M. Barthold, of which I shall also have occasion to speak hereafter, gave in the 100,

Sulphur	.	-	2
Iron	-	-	20
Magnesia	-	-	14
Alumina	-	-	17
Lime	-	-	2
Silica	-	-	42

97

From the external characters, and from his analysis, the professor considers the stone of Ensisheim to be argillo-ferruginous; and is of opinion, that ignorance and superstition have attributed to it a miraculous existence, at variance with the first notions of natural philosophy*.

The account next in succession is already printed in the Transactions of the Royal Society;

* See *Journal de Physique*, Ventose, an. 8, p. 169.

ciety ; but cannot be omitted, as it immediately relates to one of the substances I have examined. I allude to the letter received by Sir William Hamilton from the earl of Bristol, dated from Sienna, July 12, 1794 :—" In the midst of a most violent thunder-storm, about a dozen stones, of various weights and dimensions, fell at the feet of different persons, men, women, and children. The stones are of a quality not found in any part of the Siennese territory : they fell about eighteen hours after the enormous eruption of mount Vesuvius ; which circumstance leaves a choice of difficulties in the solution of this extraordinary phenomenon. Either these stones have been generated in this igneous mass of clouds, which produced such unusual thunder ; or, which is equally incredible, they were thrown from Vesuvius, at a distance of at least 250 miles ; judge then of its parabola. The philosophers here incline to the first solution. I wish much, Sir, to know your sentiments. My first objection was to the fact itself ; but of this there are so many eye witnesses, it seems impossible to withstand their evidence." (Phil. Trans. for 1795, p. 103.) Sir William Hamilton, it seems, also received a piece of one of the largest stones, which weighed upwards of five pounds ; and had seen another, which weighed

weighed about one. He likewise observed, that the outside of every stone which had been found, and had been ascertained to have fallen from the clouds near Sienna, was evidently freshly vitrified, and was black, having every sign of having passed through an extreme heat; the inside was of a light gray colour, mixed with black spots and some shining particles, which the learned there had decided to be pyrites.

In 1796 a stone weighing 56 pounds was exhibited in London, with several attestations of persons who, on the 13th of December 1795, saw it fall, near Wold Cottage, in Yorkshire, at about three o'clock in the afternoon. It had penetrated through twelve inches of soil and six inches of solid chalk rock; and, in burying itself, had thrown up an immense quantity of earth to a great distance: as it fell, a number of explosions were heard, about as loud as pistols. In the adjacent villages, the sounds heard were taken for guns at sea; but, at two adjoining villages, were so distinct of something singular passing through the air, towards the habitation of Mr. Topham, that five or six people came up to see if any thing extraordinary had happened to his house or grounds. When the stone was extracted, it was warm, smoked, and smelt very strong of sulphur. Its
course

course, as far as could be collected from different accounts, was from the south-west. The day was mild and hazy, a sort of weather very frequent in the Wold hills, when there are no winds or storms; but there was not any thunder or lightning the whole day. No such stone is known in the country. There was no eruption in the earth; and, from its form, it could not come from any building; and, as the day was not tempestuous, it did not seem probable, that it could have been forced from any rocks, the nearest of which are those of Flamborough Head, at a distance of twelve miles*. The nearest volcano I believe to be Hecla in Iceland.

The exhibition of this stone, as a sort of show, did not tend to accredit the account of its descent, delivered in a hand-bill at the place of exhibition; much less could it contribute to remove the objections made to the fall of the stones presented to the Royal French Academy. But the right hon. President of the Royal Society, ever alive to the interest and promotion of science, observing the stone so exhibited to resemble a stone sent to him as one of those fallen at Sienna, could not be misled by prejudice: he obtained a piece of this extraordinary
mass

* Extracted from the printed paper delivered at the place of exhibition.

mass, and collected many references to descriptions of similar phænomena. At length, in 1799, an account of stones fallen in the East Indies was sent to the president by John Lloyd Williams, esq. which, by its unquestionable authenticity, and by the striking resemblance it bears to other accounts of fallen stones, must remove all prejudice. Mr. Williams has since drawn up the following more detailed narrative of facts.

Account of the Explosion of a Meteor near Benares, in the East Indies ; and of the falling of some Stones at the same time, about 14 miles from that city. By John Lloyd Williams, Esq. F. R. S.

A circumstance of so extraordinary a nature, as the fall of stones from the heavens, could not fail to excite the wonder, and attract the attention of every inquisitive mind.

Among a superstitious people, any preternatural appearance is viewed with silent awe and reverence : attributing the causes to the will of the Supreme Being, they do not presume to judge the means by which they were produced, nor the purposes for which they were ordered ; and we are naturally led to suspect the influence of prejudice and superstition in their descriptions of such phænomena : my inquiries

quiries were therefore chiefly directed to the Europeans, who were but thinly dispersed about that part of the country.

The information I obtained was, that on the 19th of December 1798, about eight o'clock in the evening, a very luminous meteor was observed in the heavens, by the inhabitants of Benares and the parts adjacent, in the form of a large ball of fire; that it was accompanied by a loud noise resembling thunder; and that a number of stones were said to have fallen from it near Krakhut, a village on the north side of the river Goomty, about 14 miles from the city of Benares.

The meteor appeared in the western part of the hemisphere, and was but a short time visible: it was observed by several Europeans, as well as natives, in different parts of the country.

In the neighbourhood of Juanpoor, about twelve miles from the spot where the stones are said to have fallen, it was very distinctly observed by several European gentlemen and ladies; who described it as a large ball of fire, accompanied with a loud rumbling noise, not unlike an ill-discharged platoon of musketry. It was also seen, and the noise heard, by various persons at Benares. Mr. Davis observed the light come into the room where he was, through

through a glass window, so strongly as to project shadows from the bars between the panes, on a dark coloured carpet, very distinctly ; and it appeared to him as luminous as the brightest moonlight.

When an account of the fall of the stones reached Benares, Mr. Davis, the judge and magistrate of the district, sent an intelligent person to make inquiry on the spot. When the person arrived at the village, near which the stones were said to have fallen, the natives, in answer to his inquiries, told him, that they had either broken to pieces, or given away to the *tesseldar* (native collector) and others, all that they had picked up ; but that he might easily find some in the adjacent fields, where they would be readily discovered (the crops being then not above two or three inches above the ground) by observing where the earth appeared recently turned up. Following these directions, he found four, which he brought to Mr. Davis : most of these the force of the fall had buried, according to a measure he produced, about six inches deep, in fields which seemed to have been recently watered ; and it appeared, from the man's description, that they must have lain at the distance of about a hundred yards from each other.

What

What he further learnt from the inhabitants of the village concerning the phænomenon was, that about eight o'clock in the evening, when retired to their habitations, they observed a very bright light, proceeding as from the sky, accompanied with a loud clap of thunder, which was immediately followed by the noise of heavy bodies falling in the vicinity. Uncertain whether some of their deities might not have been concerned in this occurrence, they did not venture out to inquire into it until the next morning; when the first circumstance, which attracted their attention, was the appearance of the earth being turned up in different parts of their fields as before mentioned, where, on examining, they found the stones.

The assistant to the collector of the district, Mr. Erskine, a very intelligent young gentleman, on seeing one of the stones, brought to him by the native superintendant of the collections, was also induced to send a person to that part of the country to make inquiry; who returned with several of the stones, and brought an account similar to that given by the person sent by Mr. Davis, together with a confirmation of it from the *cauzy*, (who had been directed to make the inquiry,) under his hand and seal.

Mr.

Mr. Maclane, a gentleman who resided very near the village of Krakhut, gave me part of a stone, that had been brought to him the morning after the appearance of the phænomenon, by the watchman who was on duty at his house ; this, he said, had fallen through the top of his hut, which was close by, and buried itself several inches in the floor, which was of consolidated earth. The stone must, by his account, previous to its having been broken, have weighed upwards of two pounds.

At the time the meteor appeared, the sky was perfectly serene ; not the smallest vestige of a cloud had been seen since the 11th of the month, nor were any observed for many days after.

Of these stones, I have seen eight, nearly perfect, besides parts of several others, which had been broken by the possessors to distribute among their friends. The form of the more perfect ones appeared to be that of an irregular cube, rounded off at the edges ; but the angles were to be observed on most of them. They were of various sizes, from about three to upwards of four inches in their largest diameter ; one of them, measuring four inches and a quarter, weighed two pounds twelve ounces. In appearance, they were exactly similar :

similar: externally they were covered with a hard black coat or incrustation, which in some parts had the appearance of varnish, or bitumen; and on most of them were fractures, which, from their being covered with a matter similar to that of the coat, seemed to have been made in the fall, by the stones striking against each other, and to have passed through some medium, probably an intense heat, previous to their reaching the earth. Internally, they consisted of a number of small spherical bodies, of a slate colour, embedded in a whitish gritty substance, interpersed with bright shining spiculæ, of a metallic or pyritical nature. The spherical bodies were much harder than the rest of the stone: the white gritty part readily crumbled, on being rubbed with a hard body; and, on being broken, a quantity of it attached itself to the magnet, but more particularly the outside coat or crust, which appeared almost wholly attractable by it.

As two of the more perfect stones which I had obtained, as well as parts of some others, have been examined by several gentlemen well versed in mineralogy and chemistry, I shall not attempt any further description of their constituent parts; nor shall I offer any conjecture respecting the formation of such singular productions,

ductions, or even record those which I have heard of others, but leave the world to draw their own inferences from the facts above related. I shall only observe, that it is well known there are no volcanos on the continent of India; and, as far as I can learn, no stones have been met with in the earth, in that part of the world, which bear the smallest resemblance to those above described.

It remains for me to speak of a substance mentioned in the *Lithophylacium Bornianum*, part i. p. 125, described thus:—"Ferrum retractorium, granulis nitentibus, matrice virescenti immixtis, (*Ferrum virens* Linn.,) cujus fragmenta, ab unius ad viginti usque librarum pondus, cortice nigro scoriaceo circumdata, ad Plann, prope Tabor, circuli Bechinensis Bohemiæ, passim reperiuntur."

The iron thus described is moreover made remarkable by a note*, which observes, that credulous people assert it to have fallen from heaven, during a thunder storm, on the 3d of July 1753.

The collection of baron Born, it is well known, has a place in the cabinet of the right hon. Charles Greville, who, from the effect produced by comparing the histories and structure

* Quæ (fragmenta) 3 Julii, anni 1753, inter tonitrua, e cælo pluiffe creduliores quidam asserunt.

ture of the Italian and Yorkshire stones with the description of this iron, was induced to search the collection of Born, where he discovered the very substance asserted to have fallen on the 3d of July 1753. How far these four substances have resemblance to each other, it will soon appear not to be my province to anticipate.

The president having done me the honour to submit his specimens of the Yorkshire and Italian stones to my examination, I became indebted to Mr. Greville and Mr. Williams for a similar distinction: and, being thus possessed of four substances, to all of which the same origin had been attributed, the necessity of describing them mineralogically did not fail to present itself. To execute this task, no one could be more eager, and certainly no one better qualified, than the count de Bournon. He has very obligingly favoured me with the following descriptions.

Mineralogical Description of the various Stones said to have fallen upon the Earth. By the Count de Bournon, F. R. S.

The stones I am about to describe are not of any regular shape; and those which were found in an entire state, that is, those which had not been broken, either by their fall or

otherwise, were entirely covered with a black crust, the thickness of which was very considerable.

The stones, which fell at Benares, are those, of which the mineralogical characters are the most striking : I shall therefore begin the following description with them ; and shall afterwards make use of them, as objects of comparison, in describing the others.

Stones from Benares.

These stones, as well as the others described in this paper, whatever may be their size, are covered over the whole extent of their surface with a thin crust of a deep black colour : they have not the smallest gloss ; and their surface is sprinkled over with small asperities, which cause it to feel, in some measure, like shagreen, or fish-skin.

When these stones are broke, so as to show their internal appearance, they are found to be of a grayish ash colour ; and of a granulated texture, very similar to that of a coarse grit-stone : they appear evidently to be composed of four different substances, which may be easily distinguished by making use of a lens.

One of these substances, which is in great abundance, appears in the form of small bodies,
some

some of which are perfectly globular, others rather elongated or elliptical. They are of various sizes, from that of a small pin's head to that of a pea, or nearly so; some of them however, but very few, are of a larger size. The colour of these small globules is gray, sometimes inclining very much to brown; and they are completely opaque. They may, with great ease, be broken in all directions: their fracture is conchoid, and shows a fine, smooth, compact grain, having a small degree of lustre, resembling in some measure that of enamel. Their hardness is such, that, being rubbed upon glass, they act upon it in a slight degree; this action is sufficient to take off its polish, but not to cut it: they give faint sparks when struck with steel.

Another of these substances is a martial pyrites, of an indeterminate form; its colour is a reddish yellow, slightly inclining to the colour of nickel, or to that of artificial pyrites. The texture of this substance is granulated, and not very strongly connected: when powdered, it is of a black colour. This pyrites is not attractable by the magnet; and is irregularly distributed through the substance of the stone.

The third of these substances consists in small particles of iron in a perfectly metallic state, so
that

that they may easily be flattened or extended by means of a hammer. These particles give to the whole mass of the stone the property of being attractable by the magnet; they are, however, in less proportion than those of pyrites just mentioned. When a piece of the stone was powdered, and the particles of iron separated from it, as accurately as possible, by means of a magnet, they appeared to compose about $\frac{2}{100}$ th of the whole weight of the stone.

The three substances just described are united together by means of a fourth, which is nearly of an earthy consistence. For this reason, it is easy to separate, with the point of a knife, or even with the nail, the little globular bodies above mentioned, or any other of the constituent parts of the stone we may wish to obtain. Indeed the stone itself may readily be broken merely by the action of the fingers. The colour of this fourth substance, which serves as a kind of cement to unite the others, is a whitish gray.

The black crust with which the surface of the stone is coated, although it is of no great thickness, emits bright sparks, when struck with steel: it may be broken by a stroke with a hammer, and seems to possess the same properties as the very attractable black oxide of iron. This crust is, however, like the substance

stance of the stone, here and there mixed with small particles of iron in the metallic state: they may easily be made visible by passing a file over the crust, as they then become evident on account of their metallic lustre. This is more particularly the case with respect to the crust of those stones, which remain to be mentioned, they being much more rich in iron than that I have just described; a circumstance I think it needless to repeat in the following descriptions of them. The stone, now treated of, does not, when breathed upon, emit an argillaceous smell: the same remark may be applied to all the others.

The specific gravity of this stone is 3352.

Stone from Yorkshire.

This stone, the constituent parts of which are exactly the same as those of the stones from Benares, differs from them, however,

First, In having a finer grain.

Secondly, That the substance, described as being in the form of small globular or elliptical bodies, is not so constantly in those forms, but is also found in particles of an irregular shape; a circumstance that is not met with in the other stones: these bodies are likewise, in general, of a smaller size.

Thirdly,

Thirdly, The proportion of martial pyrites, which has precisely the same characters as that in the stones from Benares, is less; on the contrary, that of the iron in the metallic state is much greater. The quantity I was able to separate by means of the magnet, appeared to me to compose about eight or nine parts, in one hundred, of the weight of the whole mass. I observed many pieces of this iron, of a pretty considerable size; one of them, taken from a portion of the stone I had powdered in order to separate the iron, weighed several grains.

The part of the stone which is in an earthy state, and which serves to connect the other parts together, has rather more consistence than that of the preceding stones; and its appearance does not differ much from that of decomposed felspar or kaolin. The stone itself therefore, although by no means hard, is rather more difficult to break with the fingers.

Stone from Italy.

This stone was in a perfectly entire state; consequently, its whole surface was covered over with the black crust peculiar to all stones of this kind. As the stone was of a very small size,

size, it became necessary to sacrifice the whole of it to the investigation of its nature. Its grain was coarse, similar to that of the stones from Benares: in it might be perceived the same gray globular bodies, the same kind of martial pyrites, and the same particles of iron in the metallic state. The proportion of these last was much less than in the stone from Yorkshire, but rather greater than in the stones from Benares. The same kind of gray earthy substance served to connect the different parts together; and nothing more could be perceived, except a few globules, which consisted wholly of black oxide of iron, attractable by the magnet, and one single globule of another substance, which appeared to differ from all those we have already described. This last substance had a perfectly vitreous lustre, and was completely transparent: it was of a pale yellow colour, slightly inclining to green; and its hardness was rather inferior to that of calcareous spar. The quantity of it, however, was too small to be submitted to such an investigation as might have determined its nature. The black crust, which covered the stone, was rather thinner than that of the stones already described; and seemed to have undergone a kind of contraction, which had produced

ed in it a number of fissures or furrows, thereby tracing upon the surface the appearance of compartments, similar in some measure to what is observed in the stones called *septaria*.

The specific gravity of this stone was 3418.

Stone from Bohemia.

The internal structure of this stone is very similar to that of the stone from Yorkshire.— Its grain is finer than that of the stones from Benares: in it may be observed the same gray substance, both in small globules and in particles of an irregular shape; also the same particles of metallic iron. The same kind of earthy substance likewise served to connect the other parts together.

This stone, however, differs materially from the others.

First, The particles of pyrites cannot be seen without a lens.

Secondly, It contains a much larger quantity of iron in the metallic state; inasmuch, that the proportion of that metal, separated from it by means of the magnet, amounted to about $\frac{25}{100}$ ths of the weight of the whole.

This stone has also (owing, perhaps, to its having remained a much longer time in the earth

earth than the preceding ones, all of which were taken up nearly at the very instant of their fall,) another difference, viz. many of the particles of iron in a metallic state have undergone an oxidizement at their surface; a circumstance that has produced a great number of spots of a yellowish brown colour, and very near to each other, over a part of its internal substance. This oxidizement, by adding to the bulk, and to the force of action, of the part we have described as serving by way of cement to the other constituent parts of the stone, has occasioned a greater degree of adhesion between these parts, and has rendered the substance of the stone more compact.

The great quantity of iron in a metallic state which this stone contains, added to its greater compactness, makes it capable of receiving a slight degree of polish; whereas it is impossible to give any polish to the others. When polished, the iron becomes very evident, in the polished part; appearing in the form of small specks, almost close to each other, which have the colour and lustre peculiar to that metal: these specks are, in general, nearly of an equal size.

The black crust of this stone is similar to that of the others.

The

The specific gravity of the stone is 4281.

It is easy to perceive, from the foregoing description, that these stones, although they have not the smallest analogy with any of the mineral substances already known, either of a volcanic or any other nature, have a very peculiar and striking analogy with each other.— This circumstance renders them truly worthy to engage the attention of philosophers, and naturally excites a desire of knowing to what causes they owe their existence.

I proceed to consider the assistance to be derived from chemistry, in distinguishing these stones from all other known substances, and in establishing the assertion, that they have fallen on the earth.

The analysis made by the French academicians of the stone presented to them by the abbé Bachelay, was, in part, conducted by the ever to be deplored Lavoisier; but it was performed before that celebrated author had enriched chemistry with his last discoveries, and before he had given birth to the system, under which it flourishes. The result of this analysis might well induce the conclusion, that the subject of it was common pyritical matter. It was unfortunately

fortunately made of an aggregate portion of the stone, and not of each distinct substance, irregularly disseminated through it. The proportions obtained were, consequently, as accidental as the arrangement of every substance in the mass.

The analysis of M. Barthold, of the stone of Ensisheim, is subject to the same objections; but, after having the advantage of the foregoing descriptions, the researches, which follow, cannot be supposed altogether liable to a similar fatality.

Examination of the Stone from Benares.

This stone, as the Count de Bournon has already remarked, has the most distinguished characters. Indeed it is the only one of the four, sufficiently perfect (if I may be allowed that expression) to be subjected to any thing approaching to a regular analysis.

The crust, or external black covering, is the first substance, to which the attention is naturally directed. When a portion of this crust had been detached with a knife, or a file, and finely pulverized, I separated the particles attractable by a magnet; and digested the unattractable portion with nitric acid, which was presently decomposed; but, owing to a strong
adherence

adherence of some of the interior and earthy parts of the stone, it did not disentangle the coating or metalline part without some difficulty. The acid being sufficiently neutralized, the solution was passed through a filter, and saturated to excess with ammonia. An abundant precipitate of oxide of iron was produced; and, when this oxide was separated, I observed the saline liquor to have a greenish colour. I evaporated it to dryness; and redissolved the dry salt in distilled water. No precipitate was formed during the evaporation, nor was the colour of the solution entirely destroyed. It appeared to me like a triple salt, described by Mr. Hermstadt* as an ammoniacal nitrate of nickel. By examination with prussiate of ammonia, it yielded a whitish precipitate, inclining to a violet colour; and, by various properties, I was soon confirmed in the opinion that nickel was present. Since I shall have occasion more than once to treat of the triple compound, and since it has been only mentioned by Mr. Hermstadt, it is necessary now to detail some of its distinctive characters. The same chemist informs us, that the three mineral acids, with ammonia, enter into similar combinations with nickel; and I have observed

* *Annales de Chimie*, tom. xxii. p. 108.

served that oxide of nickel can be dissolved by nitrate and muriate of ammonia. The muriate seems to take up the largest quantity. The colour of this salt is by no means uniform: it is sometimes grass green, violet, rose colour, inclining to purple, and I have seen it almost colourless. It seems to be purple, and to incline to rose colour and violet, when all the oxide of nickel is not united to both acid and alkali, but from the deficiency of salt, is held in solution by an excess of ammonia. In this case, evaporation, of course, precipitates the nickel in the state of oxide, which is of a whitish green colour.

The nickel cannot be *precipitated* from a perfectly formed triple salt by any reagent I have tried, except by a prussiate, or a hydrogenized sulphuret of ammonia. Potash and lime, as well as, I presume, other bodies, standing in the order of affinities before ammonia, decompose the salt; but the nickel is then continued in solution by the disengaged ammonia.

As it may be imagined that I have occasionally met with copper, when I describe a violet or purple ammoniacal solution, it is right to observe, that, to avoid this error, I have either reduced the liquor to a neutral state, and endeavoured, without success, to obtain from it a precipitate, with a solution of sulphureted hydrogen

hydrogen gas ; or, by adding an acid to slight excess, and immersing a piece of iron, I have not been able to detect a trace of copper.— These, and many other trials, when they do not appear to be made before the estimation of the quantities of nickel, have been constantly made afterwards.

But, to return to the incrustation or coating of the stone, the decomposition of the nitric acid showed the presence of matter at least nearly metallic, although not attractable ; and the examinations made of the liquor, from which the iron was precipitated, ascertained the presence of nickel beyond dispute. The difficulty of obtaining the coating of the stone, either distinct from matter not belonging to it, or in sufficient quantity, induced me to relinquish the idea of attempting to give the proportions of its constituent parts.

The stone being deprived of its covering, the shining particles irregularly disseminated next demand examination. I first examined the pyrites. Their very loose texture made it exceedingly difficult to collect the weight of 16 grains, which was however effected by the dexterity of the Count de Bournon.

I digested these, at a low heat, with weak muriatic acid ; which acted gradually, and disengaged a trifling but sensible quantity of sulphureted

phureted hydrogen gas. After several hours, I found the acid discontinued its action. The whole metalline part appeared in solution ; but sulphur and earthy particles were observable. The sulphur, from its small specific gravity, was suspended through the solution ; whilst the earthy matter, which could not be separated by mechanical means, was fortunately left at the bottom of the digesting vessel. I decanted off the solution, holding suspended the sulphur ; and, by repeated washing, separated every thing belonging to the pyrites from the insoluble earthy matter, the subtraction of which reduced the weight of real pyrites to 14 grains. I next obtained the sulphur, by filtration.—When it was as dry as I could make it, without fear of its being sublimed, its weight was two grains. To the filtrated liquor I added nitrate of barytes, by way of detecting any sulphuric acid, which might have been present ; but no cloudiness ensued. I then separated, by sulphate of ammonia, the barytes thus added, and precipitated the iron with ammonia. The liquor, on the subsidence of oxide of iron, appeared of a violet purple colour : it contained nickel, which I threw down with sulphureted hydrogen gas, there being already a sufficient excess of ammonia in the saline liquor to form

an alkaline hydrogenized fulphuret. The oxide of iron, after ignition, weighed 15 grains; and the fulphuret of nickel, reduced to an oxide, weighed, after the same treatment, something more than one grain. The proportions of the substances contained in the pyrites of the stone from Benares may therefore be considered nearly thus:

	<i>Grains.</i>
Sulphur - - - - -	2
Iron - - - - -	10 $\frac{1}{2}$
Since 15 grains of the oxide represent about that quantity of iron,	
Nickel, nearly - - - - -	1
Extraneous earthy matter - - - - -	2
	15 $\frac{1}{2}$

It is observable that, notwithstanding the loss appears to be only half a grain, it was probably more, because the sulphur could not be reduced to the same state of dryness, in which it existed when in combination with the iron; not to say that it was, in a small degree, volatilized with the hydrogen gas disengaged during the solution.

The weight of nickel is a mere estimation. We are not yet sufficiently acquainted with that metal to speak of it with accuracy, except
as

as to its presence. Upon the whole, however, it may be concluded, that these pyrites are of a very particular nature; for, although Henkel has observed that sulphur may be separated from pyrites by muriatic acid, it is by no means the usual habitude of pyrites to be of such easy decomposition.

The other shining particles immediately seen, when the internal structure of the stone is exposed, are the malleable iron. Before I state the examination of this iron, I must remark, that preliminary experiments having shown me it contained nickel, I treated several kinds of the most pure irons I could obtain, with nitric acid; and precipitated the oxide from the metallic salt by ammonia. The quantity of oxide I obtained from 100 grains of iron was from 144 to 146. I may consequently infer, that 100 grains of pure iron acquire, by such a process, 45 grains of oxygen; and that, whenever a metallic substance, supposed to be iron, does not, under the same circumstances, acquire the same proportionate weight, something is either volatilized, or left in solution. Hence, when a metallic alloy of nickel and iron presents itself, a judgment may, at least, be formed of the quantity of nickel, by the deficiency of weight in the precipitated oxide of iron.

This mode of treatment was not allowed me in the examination of the coating of the stone, because it was impossible to know in what state of oxidizement the iron existed. But, as the particles disseminated through the whole mass are clearly metallic, a very tolerable idea of the quantities of nickel contained in them will be obtained, by noting the quantity of oxide of iron separated, as above described. 25 grains of these metallic particles were therefore heated with a quantity of nitric acid, much more than sufficient to dissolve the whole. Some earthy matter, which, as in a former case, was not separable by mechanical means, remained after a complete solution of the metal had been effected. This earthy matter, after being ignited, weighed two grains. The real matter of the present examination was therefore reduced to 23 grains, and was in complete solution. I added ammonia to a very sensible excess. The oxide of iron was thereby precipitated, and, being collected and ignited, it weighed 24 grains; whereas, according to my experiments, $33\frac{1}{2}$ grains should have been produced from the solution, had it contained nothing but iron. I examined the saline liquor, when free from ferruginous particles, and discovered it to be the triple salt of nickel. Hence, allowing for loss, the quantity of nickel may be estimated,

estimated, by calculating the quantity of iron contained in 24 grains of oxide. Thus, if 145 grains of oxide contain 100 of iron, about $16\frac{1}{2}$ are contained in 24 of oxide. This would suppose the 23 grains of alloy to consist of $16\frac{1}{2}$ iron, and $6\frac{1}{2}$ nickel; which, if the usual loss be added to the $16\frac{1}{2}$ grains of iron, and deducted from the nickel, may not be very remote from the truth.

I shall next examine the globular bodies, also irregularly dispersed throughout the stone. A number of them were reduced to fine powder; but nothing metallic could be separated by the magnet. As a preliminary experiment, I sought for pyrites, by digestion with muriatic acid; but no hepatic smell was in the least perceivable, nor was white carbonate of lead at all altered by being held over the mixture. I therefore conclude these globular bodies do not envelope either iron or pyrites. By way of analysis, I treated 100 grains with potash, in a silver crucible; and, after the usual application of a red heat, separated as much filica as possible, by muriatic acid and evaporation. The filica being collected on a filter, carbonate of potash was added to the filtrated liquor; by which a precipitate almost wholly ferruginous was produced. This precipitate was collected in the common way; then boiled with potash, to extract alumina; and, by super-saturating the alkaline liquor

liquor with muriatic acid, and precipitating by carbonate of ammonia, an earth was gathered, which I afterwards found to be partly, if not entirely, siliceous. After redissolving, in muriatic acid, the portion of the ferruginous matter rejected by the potash, I precipitated by ammonia, what I took to be entirely oxide of iron; but, after igniting it, and again attempting to redissolve the whole in muriatic acid, more silica was left. The non-existence of lime was proved, by the addition of carbonate of ammonia, immediately after the same alkali, pure, had thrown down what I took wholly for oxide of iron. I had now obtained every thing in the subject of my analysis, except magnesia and nickel. The former, and a trace of the latter, were held by carbonic acid in the liquor, from which the ferruginous precipitate was, in the first instance, thrown down by carbonate of potash; and the latter was found in the last-named muriate of ammonia. I disengaged the magnesia, by the assistance of potash, and by evaporating to dryness. The oxide of nickel was precipitated by hydrogenized sulphuret of ammonia.

Under all circumstances, I am induced to state the proportions of constituent parts thus:

Silica

Silica	-	-	-	50
Magnesia	-	-	-	15
Oxide of iron	-	-	-	34
Oxide of nickel	-	-	-	$2\frac{1}{2}$
				101 $\frac{1}{2}$

The excess of weight, instead of the usual loss, is owing to the difference of oxidizement of the iron, in the stone and in the result of the analysis; which will be found to be the case in all analyses of these substances; indeed it is always necessary to reduce the oxide to the red state, as being the only one to be depended upon. To avoid future repetition, I shall also observe, first, that by preliminary experiments I could not detect any other substance than those mentioned. Secondly, that the earth obtained as alumina appeared to me to be mostly, if not entirely, siliceous; because, after it had been ignited, and again treated with potash and muriatic acid, I found it was very nearly all precipitated by evaporation. Thirdly, I examined, and judged of, the silica collected from the oxide of iron, in the same way.—Fourthly, the weight of the magnesia is given, not immediately, as obtained by evaporation, but after a subsequent solution in an acid, and precipitation by potash. And, fifthly, the proportions are taken from the mean of two analyses.

Nothing

Nothing remains to be examined, of the stone from Benares, except the earthy matter, forming a cement or matrix for the substances already examined. 100 grains of this matter were, by mechanical means, separated as perfectly as possible, from the pyrites, iron, and globular bodies, and analysed as above. The mean result of two analyses gave,

Silica	-	-	-	48
Magnesia	-	-	-	18
Oxide of iron		-	-	34
Oxide of nickel		-	-	$2\frac{1}{2}$
				$102\frac{1}{2}$

Examination of the Stone from Sienna.

The external coating of this stone appeared to have the same characters as that of the stone from Benares.

The pyrites, although certainly present, were not crystallized in such groups as in the preceding stone; nor could they be separated by mechanical means.

The attractable metal was easily separated by the magnet; but $8\frac{1}{2}$ grains only were collected. I treated them with nitric acid and ammonia, as in the preceding case. Nearly one grain
of

of earthy matter was insoluble; the weight was therefore reduced to rather less than eight grains; and the saline liquor gave abundant indications of nickel. As eight grains of this oxide of iron contain nearly six of metal, the quantity of nickel in the bare eight grains may be estimated between one and two grains. Some globular bodies were extracted, but too few to analyse.

Since the pyrites could not be separated, I collected 150 grains of the stone, freed from iron by the magnet, and as exempt as possible from globular bodies. These 150 grains I first digested with muriatic acid, that the pyrites might be decomposed, and every thing taken up which could be dissolved by that menstruum. A very decided disengagement of sulphureted hydrogen gas was occasioned. When the acid could produce no further action, I collected the undissolved matter on a filter, and boiled it with the most concentrate nitric acid, in hopes of being able to convert the sulphur, previously liberated, into sulphuric acid: but my endeavours were fruitless; for, upon the addition of nitrate of barytes to the nitric solution, rendered previously transparent, a very insignificant quantity of sulphate of barytes was obtained. The surplus of barytic nitrate was removed by sulphate of potash. I next completelyedulco-
rated

rated the mass, which remained insoluble after the action of the muriatic and nitric acids ; and, adding the water of edulcoration to the muriatic and nitric liquors, evaporated the whole for silica. I then submitted the mass, undissolved by the acids and the water, to the treatment with potash, muriatic acid, and evaporation, which was, in the first instance, applied to the stone from Benares. The first precipitation was, as in that analysis, also effected with carbonate of potash ; but, instead of endeavouring immediately to extract alumina, I ignited the precipitate, that the alumina or silica remaining might be rendered insoluble. After the ignition, I separated the oxide of iron with very concentrate muriatic acid ; and the earths, which were left perfectly white, I heated with potash, until they were again capable of being taken up by the same acid. The solution so made was slowly evaporated ; and, as very nearly every thing was deposited during the evaporation, I conclude all was silica. The proportions resulting from this single analysis, without the weight of sulphur contained in the pyrites irregularly disseminated through the whole, were,

Silica

Silica	-	-	-	70
Magnesia	-	-	-	34
Oxide of iron	-	-	-	52
Oxide of nickel	-	-	-	3
				159

Examination of the Stone from Yorkshire.

The mechanical separation of the substances in this stone being as difficult as in the preceding case, I was necessarily satisfied with submitting it to the same treatment. I collected, however, 34 grains of malleable particles; which, by the process already more than once mentioned, left four grains of earthy matter; and, by yielding $37\frac{1}{2}$ of oxide of iron, indicated about four grains of nickel.

150 grains of the earthy part of the stone were, by analysis, resolved into,

Silica	-	-	-	75
Magnesia	-	-	-	37
Oxide of iron	-	-	-	48
Oxide of nickel	-	-	-	2
				162

Examination of the Stone from Bohemia.

The probability of never being able to obtain another specimen of the very remarkable fragment

fragment of this substance, did not allow me to trespass more on the liberality of Mr. Greville, than to detach a small portion. I found it of similar composition to that of the three preceding stones; and the count de Bournon has already shown the proportionate quantity of the attractable metal to be very considerable. $16\frac{1}{2}$ grains left $2\frac{1}{2}$ of extraneous earthy matter; and yielded, by the treatment with nitric acid and ammonia, $17\frac{1}{2}$ grains of oxide of iron. This would seem to induce an estimation of $1\frac{1}{2}$ of nickel in 14 grains, or about nine per cent.

55 grains of the earthy part of the stone, by the analytical treatment of the two former, afforded,

Silica	-	-	-	-	25
Magnesia	-	-	-	-	$9\frac{1}{2}$
Oxide of iron	-	-	-	-	$23\frac{1}{2}$
Oxide of nickel	-	-	-	-	$1\frac{1}{2}$
					$59\frac{1}{2}$

The unusual increase of weight in the result of the three last analyses, notwithstanding the entire loss of the sulphur in the pyrites, is obviously owing to the metallic state of the iron combined with the sulphur, as was shown in a former instance.

I have

I have now concluded the chemical examination of these four extraordinary substances. It unfortunately differs from the analysis made by the French academicians, of the stone presented to them by the abbé Bachelay, as well as from that made by professor Barthold of the stone of Ensisheim. It is at variance with that of the academicians, inasmuch as they found neither magnesia nor nickel. It differs from that of Mr. Barthold, as he did not find nickel, but discovered some lime, with 17 per cent. of alumina. With regard to these differences, I have to submit to the chemical world, whether magnesia might not have eluded the action of an acid, when the aggregation of the integrant parts of the stone was not destroyed by treatment with potash. As to the existence of alumina, I do not absolutely deny it; yet I must observe, that the whole of the earth which seemed to have any resemblance, however small, to alumina, was at most 3 per cent., and there seems good reason to consider it as silica. Respecting the existence of lime in the stone of Ensisheim, I must appeal to professor Barthold, whether, supposing lime a constituent part, sulphate of lime should not have been formed, as well as sulphate of magnesia, when sulphuric acid was generated by igniting the earths and pyrites. And, as to the proportion

tion of alumina in the same stone, I would ask, at least, whether it would have been so considerable if the solutions formed by acids, after the treatment with potash, had been evaporated to the requisite dryness: not to observe, that no mention is made of any examination of the properties of the earth called alumina. In the proportion of magnesia I have the satisfaction to find my analysis correspond very nearly with that of professor Barthold; and, if what he considered alumina were supposed silica, the stone presented to the French academy, the stone of Ensisheim, and the four I have examined, would agree very nearly in siliceous proportions. With respect to the nickel, I am confident it would have been found in all, had the metallic particles been separately examined. But, whatever be these variations, the mineralogical description of the French academicians, of Mr. Barthold, and of the count de Bournon, all exhibit a striking conformity of character, common to each of these stones; and I doubt not but the similarity of component parts, especially of the malleable alloy, together with the near approach of the constituent proportions of the earths contained in each of the four stones, the immediate subject of this paper, will establish very strong evidence in favour of the assertion, that they have fallen on our globe.

They

They have been found at places very remote from each other, and at periods also sufficiently distant. The mineralogists, who have examined them, agree that they have no resemblance to mineral substances properly so called, nor have they been described by mineralogical authors. I would further urge the authenticity of accounts of fallen stones, and the similarity of circumstances attendant on such phenomena; but to the impartial it would be superfluous, and, to those who disbelieve whatever they cannot explain, it would be fruitless. Attempts to reconcile occurrences of this nature with known principles of philosophy, it is true, are already abundant; but (as the earl of Bristol has well expressed) they leave us a choice of difficulties equally perplexing. It is, however, remarkable that doctor Chladni, who seems to have indulged in these speculations with most success, should have connected the descent of fallen stones with meteors; and that, in the narrative of Mr. Williams, the descent of the stones near Benares should have been immediately accompanied with a meteor.

No luminous appearance having been perceived during the day, on which the stone fell in Yorkshire, it must be admitted, rather militates against the idea that these stones are the substances, which produce or convey the
light

light of a meteor, or that a meteor must necessarily accompany them*. Yet the stones from Sienna fell amidst what was imagined lightning, but what might in reality have been a meteor. Stones were also found after the meteor seen in Gascony, in July 1790. And Mr. Falconet, in the memoir I have already quoted, relates that the stone, which was adored as the mother of the gods, was a *bætilia*; and that it fell at the feet of the poet Pindar, enveloped in a ball of fire. He also observes, that all the *bætilia* had the same origin.

I ought not, perhaps, to suppress, that in endeavouring to form an artificial black coating on the interior surface of one of the stones from Benares, by sending over it the electrical charge of about 37 square feet of glass, it was observed to become luminous, in the dark, for nearly a quarter of an hour; and that the track of the electrical fluid was rendered black. I by no means wish to lay any stress upon this circumstance; for I am well aware, that many substances become luminous by electricity.

But, should it ever be discovered that fallen stones are actually the bodies of meteors, it would not appear so problematical, that such
masses

* In the account of the stone, which fell in Portugal, no mention is made either of a meteor or lightning.

masses as these stones are sometimes represented, do not penetrate further into the earth: for meteors move more in a horizontal than in a perpendicular direction; and we are as absolutely unacquainted with the force which impels the meteor, as with the origin of the fallen stone.

Before I close this subject, I may be particularly expected to notice the meteor, which, a few months ago, traversed the county of Suffolk. It was said that part of it fell near Saint Edmundsbury, and even that it set fire to a cottage in that vicinity. It appeared, from inquiries made on the spot, that something, seemingly from the meteor, was, with a degree of reason, believed to have fallen in the adjacent meadows; but the time of the combustion of the house did not correspond with the moment of the meteor's transition. A phenomenon much more worthy of attention has since been described in the Philosophical Magazine. On the night of the 5th of April 1800, a body wholly luminous was seen, in America, to move with prodigious velocity. Its apparent size was that of a large house, 70 feet long; and its elevation above the surface of the earth about 200 yards. The light produced effects little short of sun-beams; and a considerable degree of heat was felt by those who saw it,

K

but

but no electric sensation. Immediately after it disappeared in the north-west, a violent rushing noise was heard, as if the phenomenon were bearing down the forest before it; and, in a few seconds after, there was a tremendous crash, causing a very sensible earthquake.—Search being afterwards made in the place where the burning body fell, every vegetable was found burnt, or greatly scorched, and a considerable portion of the surface of the earth broken up. We have to lament, that the authors of this account did not search deeper than the surface of the ground. Such an immense body, though moving in a horizontal direction, could not but be buried to a considerable depth. Should it have been more than the semblance of a body of a peculiar nature, the lapse of ages may perhaps effect what has now been neglected; and its magnitude and solitary situation become the astonishment of future philosophers.

This leads me to speak of the solitary mass of what has been called native iron, which was discovered in South America, and has been described by Don Rubin de Celis. Its weight was about 15 tons. The same author mentions another insulated mass of the same nature. The whole account is exceedingly interesting; but, being already published in the
Philosophical

Philosophical Transactions for the year 1788, it needs not be here repeated.

Mr. Proust has shown the mass particularly described, not to be wholly iron, but a mixture of nickel and iron. The trustees of the British Museum, who are in possession of some fragments of this mass, sent to the Royal Society by Don Rubin de Celis, have done me the honour to permit me to examine them; and I have great satisfaction in agreeing with a chemist so justly celebrated as Mr. Proust.

The connection, which naturally exists between one mass of native iron and another, immediately turns our attention to the native iron in Siberia, described by Pallas; and this, we are told, the Tartars considered as a sacred relic, which had dropped from heaven. The nickel found in the one mass, and the traditional history of the other, not to compare the globular bodies of stone from the Benares with the globular concavities and the earthy matter of the Siberian iron, tend to the formation of a chain between fallen stones and all kinds of native iron. How far any real affinity exists between these several substances, very obliging friends have afforded me an opportunity to form some judgment. I am indebted to Mr. Greville and Mr. Hatchett for portions of almost every known native iron;

and the count de Bournon has done me the favour particularly to describe them as follows.

*Description of various Kinds of Native Iron. By
the Count de Bournon.*

The great number of particles of iron, in a perfectly metallic state, contained in the stone from Bohemia, and the said particles being so near each other, naturally lead to some reflections respecting the existence of native iron, which, by many mineralogists, is still considered as problematical. Let us suppose for a moment, that these particles of iron were to approach still more nearly to each other, so as absolutely to come into contact, and in that manner to form a kind of chain, folded upon itself in the interior part of the substance, and leaving a great number of cavities between the links of the chain so folded. Let us then suppose, that the earthy substance with which these cavities are filled, being very porous, and having but a small degree of consistence, should (as may happen by a variety of causes) be destroyed. It is plain that, if such a destruction were to take place, the iron alone would remain; and, being thus left bare, it
would

would appear in the form of a mass, more or less considerable, of a cellular texture, and as it were ramified; such a form, in short, as that in which most of the native irons we are acquainted with have been found. - May it not be fair to attribute to such an origin the native iron found in Bohemia, a specimen of which was presented by the Academy of Freyberg to baron Born, and which came, with the rest of his collection, into the hands of Mr. Greville? May not such also, notwithstanding the enormity of its bulk, be the origin of the mass of native iron found in Siberia, near Mount Kemirs, by the celebrated Pallas?

We have already seen, in the results of the analyses made by Mr. Howard, of the various stones above described, that he constantly found a certain proportion of nickel mixed with the iron they contained. This circumstance recalls to our notice the observations that were made by Mr. Proust, some time ago, respecting the mixture of nickel in the native iron of South America; and tends to give some additional support to the opinion hinted at in the foregoing paragraph.

The circumstances just mentioned naturally gave to Mr. Howard, as well as to me, a desire to know whether the native iron from Siberia, and that from Bohemia, were also mixed with
nickel

nickel. Mr. Howard, consequently, lost no time in proceeding upon this important investigation. The native iron of Siberia presents some very interesting peculiarities, and has often been referred to, but has not yet been properly described; it is therefore with great pleasure that I add the following description of it, and of some other kinds of native iron, to the description I have already given of the various stones said to have fallen on the earth.

I feel the greater satisfaction in doing this, as the noble collection of Mr. Greville contains two specimens of this iron, in perfect condition; one of which weighs several pounds, and was sent to Mr. Greville by Mr. Pallas himself: on this account, therefore, I enjoy an advantage, that many of the authors, who have spoken of this iron, probably wanted.

One of these pieces has a cellular and ramified texture, analogous to that of some very porous and light volcanic scoria; this is the usual texture of the specimens of this kind of iron, which are preserved in the various mineralogical collections in Europe. When it is attentively examined, there may be perceived in it, not only empty cells, but also impressions or cavities, of greater or less depth, and sometimes perfectly round, which appear evidently to be the result of the compression of hard bodies

dies, which were situated there, and which, when they came away, left the surface of these cavities quite smooth, and having the lustre of polished metal. Here and there, in some of these cavities, there remains a transparent substance, of a yellowish green colour, of which I shall treat more particularly when I come to the description of the second of the specimens above mentioned. It is very clear, that the cavities here spoken of owe their existence to this transparent substance; and that the polish of the cavities arises merely from the compression of the said substance, and is the natural consequence of its surface having been in perfect contact with that of the iron.

This iron is very malleable: it may be easily cut with a knife; and may be as easily flattened or extended by means of a hammer. Its specific gravity is 6487; which, however, is very much under that of iron, which has been merely melted, and has not been forged. The specific gravity of the native iron of Bohemia, which is nearly as malleable and as easy to be cut, is still less: I found it not to exceed 6146. This low degree of gravity appears to be owing partly to the oxidizement of the surface of the iron, and partly to there being, in the interior part of its substance, a number of small cavities, which are often rendered visible
by

by fracture, and which have their surfaces also oxidized. The fracture of this iron presents the same shining and silvery white colour as the common cast iron known by the name of white cast iron : but its grain is much smoother and finer ; it is also much more malleable when cold. Bergman says that this iron is brittle, when heated to a red heat. I have frequently tried it in that state, and have constantly found it to be malleable. The same remark may be applied to the native iron from South America, and also to that from Senegal.

The second of the two specimens mentioned above, and which weighs several pounds, presents an aspect that differs, in some respects, from that of the preceding specimen. The most considerable part of it forms a solid compact mass, in which there is not to be perceived the smallest appearance of pores or cavities ; but there arises upon its surface a kind of ramified or cellular part, similar, in every respect, to the specimen already described, and every where completely connected with the substance of the mass itself.

If the compact part of this piece is examined with attention, it will be perceived that it is not entirely composed of iron in the metallic state, but that it is mixed with nearly an equal quantity of the transparent substance of a yellowish

lowish green colour, (sometimes also of a greenish yellow,) already spoken of in the description of the other specimen. This substance is mixed with the iron in such a manner that, if the whole of the former could be removed, the remaining part would consist merely of iron in the metallic state, and would present the same cellular appearance as the preceding specimen, and the ramified or cellular part of the specimen now described.

This stony part, separated from the iron, appears in the form of small nodules, generally of an irregular shape, but sometimes nearly globular; they have a perfectly smooth and shining surface, so as very often to present the appearance of small balls of glass; a circumstance that has led many persons to suppose them the result of a real vitrification. Some of these nodules have several irregular facets, produced by the compression of the iron, in which they were inclosed; but I have never observed in them any appearances, that could lead me to suspect they had the slightest tendency whatever to assume a determined crystalline form.

This substance is always more or less transparent. It is sufficiently hard to cut glass, but has no effect upon quartz. It is very brittle: its fracture is usually conchoid; but I could
perceive

perceive, that it broke in any particular direction, in such a way that I could consider the fracture as a natural one. It becomes electric by friction. Its specific gravity is from 3263 to 3300. It is very refractory: I kept it, for some time, exposed to a degree of heat sufficiently strong to oxidize, to a considerable depth, the iron crucible in which it was placed, without its having undergone any alteration, except that of having acquired a greater degree of intensity in its colour. Its transparency was not at all diminished. I think, therefore, there is not the smallest reason to allow any probability to the opinion that it ought to be considered as a kind of glass.

Of all the substances hitherto known, that, with which it seems to have the greatest analogy, is the peridot, (the chrysolite of Werner,) to which some mineralogists have referred it. The result of Mr. Howard's analysis of it is nearly the same as that of the analysis of the peridot made by Mr. Klaproth.

The hardness and infusibility of this substance are nearly the same as those of the peridot; but it seems to have a rather less degree of specific gravity: that of two very perfect crystals of peridot I found to be from 3340 to 3375. The crystalline forms of the
substance

substance here described, if ever we should be able to determine them, would clear up our doubts respecting the analogy between the two substances. If we consider the compact part of the specimen now treated of, particularly the strong connection, that appears to exist between the iron and the transparent substance, and the great resistance we experience when we attempt to separate them, we cannot help being surprised, that almost all the specimens of this mass of metallic iron, that have been brought to Europe, are in the cellular state already described, owing apparently to the total, or almost total, destruction of the transparent substance. But, besides the fragility of this substance, the specimen in question helps very much to explain the above circumstance, inasmuch as many of the nodules of the transparent substance belonging to it are in a state of real decomposition. In that state, they are changed into a white opaque substance, which, upon being lightly pressed or squeezed between the fingers, crumbles into a gritty dry powder. This decomposition may be observed to have taken place in various degrees: in many of the nodules, the substance is merely become friable, without being much altered in its appearance; whereas some of those, which are in a state of complete decomposition

position, are of an ochreous reddish yellow colour : it is, however, easy to distinguish that this colour does not belong to them, but is owing only to the oxidizement of the adjacent particles of iron.

From the above observations it will not be difficult to conceive the possibility of the total, or nearly total, destruction of the transparent substance ; and also, the appearance the pieces of iron must naturally present when deprived of it. I cannot help observing likewise, that there appears to exist a very interesting analogy between these transparent nodules, and the globules I described as making part of the stones said to have fallen on the earth. This analogy, though not a very strong one, may lead us to suppose, that the two substances are similar in their nature, but that the globules are less pure, and contain a greater quantity of iron.

The native iron from Bohemia is a compact mass, similar to the compact part of the large specimen of iron from Siberia, which has just been described : like that, also, it contains a number of globular bodies or nodules ; but they are not in such great proportion as in the Siberian iron. They are besides perfectly opaque, and very much resemble the most compact

part of the globules belonging to the stones said to have fallen on the earth.

Examination of the Iron from South America.

I have already observed, that my experiments coincided with those of Mr. Proust. He obtained 50 grains of sulphate of nickel from 100 of this mass. The process I have so frequently mentioned yielded me 80 grains of oxide of iron from 62 of the metal; which indicates about $7\frac{1}{2}$ of nickel, or about 10 per cent.

Examination of the Siberian Iron.

100 grains of this iron gave 127 of oxide of iron: hence it should contain about 17 per cent. of nickel.

The yellow substance belonging to this iron was analysed in the same way as the globular bodies, and the earthy parts, of the stone from Benares.

The

The proportions resulting from the analysis of 50 grains, and from some previous experiments on other particles, were,

Silica	-	-	-	-	27
Magnesia	-	-	-	-	$13\frac{1}{2}$
Oxide of iron	-	-	-	-	$8\frac{1}{2}$
Oxide of nickel	-	-	-	-	$\frac{1}{2}$
					$49\frac{1}{2}$

Examination of the Bohemian Iron.

$26\frac{1}{2}$ grains of this metal left about $1\frac{1}{2}$ grain of earthy matter, insoluble in nitric acid ; and, by ammonia, afforded 30 grains of oxide of iron, inducing an estimation of nearly 5 of nickel.

Examination of Iron from Senegal, brought by General O'Hara, and given to me by Mr. Hatchett.

In this experiment, 199 grains of oxide were produced from 145 grains of metal : hence there may be an estimation of 8 grains in 145, or between 5 and 6 per cent. of nickel.

It

It will appear, from a collected view of the preceding pages and authorities, that a number of stones asserted to have fallen under similar circumstances have precisely the same characters. The stones from Benares, the stone from Yorkshire, that from Sienna, and a fragment of one from Bohemia, have a relation to each other not to be questioned.

1st, They have all pyrites of a peculiar character.

2dly, They have all a coating of black oxide of iron.

3dly, They all contain an alloy of iron and nickel. And,

4thly, The earths, which serve to them as a sort of connecting medium, correspond in their nature, and nearly in their proportions.

Moreover, in the stones from Benares, pyrites and globular bodies are exceedingly distinct. In the others they are more or less definite; and that from Sienna had one of its globules transparent. Meteors, or lightning, attended the descent of the stones at Benares and at Sienna. Such coincidence of circumstances, and the unquestionable authorities I have adduced, must, I imagine, remove all doubt as to the descent of these stony substances;

stances ; for to disbelieve, on the mere ground of incomprehensibility, would be to dispute most of the works of nature.

Respecting the kinds of iron called native, they all contain nickel. The mass in South America is hollow, has concavities, and appears to have been in a soft or welding state, because it has received various impressions.

The Siberian iron has globular concavities, in part filled with a transparent substance, which, the proportional quantity of oxide of iron excepted, has nearly the composition of the globules in the stone from Benares.

The iron from Bohemia adheres to earthy matter studded with globular bodies.

The Senegal iron had been completely mutilated before it came under my examination.

From these facts I shall draw no conclusion, but submit the following queries :

1st, Have not all fallen stones, and what are called native irons, the same origin ?

2dly, Are all, or any, the produce or the bodies of meteors ?

And,

And, lastly, Might not the stone from Yorkshire have formed a meteor in regions too elevated to be discovered ?

Specimens of the Benares and Yorkshire stones have been deposited, by the president, in the British Museum.

1.

FROM

FROM
MILLIN'S MAGAZIN ENCYCLOPEDIQUE,

NO. 15, NIVOSE, AN. II.

PARIS.

PHILOMATHIC SOCIETY.

An interesting paper was read on the mineral substances supposed to have fallen from the heavens, and lately analysed by Messrs. Howard and Bournon.

In one of our late numbers we have spoken of a particular kind of stones, hitherto found in very small quantities, and in places far distant from each other, but which resemble each other in all points, in exterior aspect, and chemical composition. We have shewn the characters, which distinguish them from all mineral substances at present known. Lastly, we have given the reasons which cause us to think, that these stones are not natural to our globe, but that they have fallen from the heavens at different times.

We

We have said that this phenomenon, strange as it may appear, is so little contrary to the laws of nature, that we may assign a cause, indeed hypothetic, but yet conformable to all the rules of sound philosophy.

It is to be observed, that we do not pretend to assign a real and certain cause of this phenomenon, but merely to offer a *supposition* capable of shewing, that the circumstance of stones thus falling does not include any impossibility.

The hypothesis we propose is, that those substances might have been emitted from the surface of the moon.

This explication will perhaps, at first sight, be considered whimsical and even absurd ; but if we reflect, that the phenomenon itself has at first been looked upon as an absurdity, before it was examined, whereas at present it seems extremely difficult not to submit to the many proofs, by which it is attested, it must be agreed that, before the point is decided upon, the reasons, that may render things probable, ought to be listened to and weighed.

It is well known, that the action of gravity is not confined to the surface of the earth ; it is it that, though weakened by the distance, still retains the moon in its orbit. The bodies

existing at the surface of that satellite gravitate towards its centre ; accordingly a body, placed between the moon and the earth, would be subject to the double action of their gravities.

It is easy therefore to conceive, that there must exist in the line that connects the moon and the earth, but much nearer to the former than to the latter, a point where those two attractions are equal ; a body placed in that point would be in equilibrium, and, according as it might remove from it on one side or the other, it should fall either on the moon or on the earth.

Let us suppose that, through any cause whatsoever, for instance a volcanic eruption (for we know that there are volcanoes in the moon) substances are driven beyond this point of equilibrium ; they must descend towards the earth and fall upon it.

The initial impulse will not be checked by the atmosphere of the moon ; for we know, from the occultations of the stars, that this atmosphere, if it exists at all, has scarcely any density, while at the surface of the earth the greatest powers of projection would be soon annihilated.

These

These stones, ejected by the volcanoes of the moon, would proceed towards the earth with an accelerated motion; falling from so great a distance they would enter our atmosphere with a considerable velocity, which would be gradually weakened by the resistance of that fluid, and would at length arrive to the surface of the earth with the usual velocity of heavy bodies, but probably heated and perhaps inflamed by the friction caused by the enormous resistance they had met with.

If these substances were of the same nature as those found on the earth, such a phenomenon could not be noticed as extraordinary; and if ever it could be discovered, that would be owing only to there occurring some substances that were totally unknown. Accordingly it would suffice for the purpose, that some of those substances ejected by the lunar volcanoes were different from those, which are exhibited by volcanic eruptions on the earth.

“ Not wishing to give too much weight to this explication, we shall beg leave to ask, if it does not exactly account for the phenomena we are inquiring into, and for all the circumstances,

circumstances, with which we are assured that they are attended.

Thus has this hypothesis been proposed with equal sagacity and caution by C. Laplace."

FROM

FROM THE
BIBLIOTHEQUE PHYSICO-ECONOMIQUE,
AN. 1786.

*A Memoir on the means of rendering Smutty
Wheat fit for Market, and for making Bread.*

TRANSLATED BY
THE REV. JOHN DUBOURDIEU.

This Memoir has two objects; the first, to increase the value of smutty wheat in the market; the second, to prepare bread of a good quality from it.

All wheat is called smutty, when the chests of some of the ears contain a black dust, instead of a farinaceous substance, which the flail breaks in the operation of threshing, and which adhering to the sound grain spoils its colour,

colour, and communicates a degree of blackness to the flour.

Disadvantages of Smutty Wheat.

The disadvantages are in proportion to the quantity of diseased grain ; and are as follow : The infected grain never *sweats** compleatly in the granary, and consequently it cannot be preserved so long ; for the black dust, with which it is covered, prevents the moisture from escaping in the granary. If it is sent to market, it is sold four francs or a hundred sols by the *Setier*† cheaper than grain of the same quality, which is not diseased. When it is taken to the mill, even after having remained a considerable time in the granary, it clogs the millstones, greases the bolting sieves, delays the grinding, and gives less flour. The grinding of good grain, after that which is smutty, is injured, by communicating its bad qualities to it. The flour of smutty grain is of a dirty white, soft and greasy to the touch ; in baking it proportionably absorbs but little water, emits a smell like rancid grease, and is difficult to keep. After this the author mentions
the

* *Reffue* is the word I have translated *sweats*.

† A French measure, equal to twelve bushels.

the different modes, that have been tried to remedy this defect in grain, and which have proved ineffectual: *first*, that of sifting it often; *secondly*, drying it, and turning it in the granary; *thirdly*, by mixing an absorbent earth reduced to powder with it; *fourthly*, by sprinkling it with water, drying, and sifting it. He then mentions washing the grain completely as the only method of freeing it from the effects of this disease, which those farmers in France, that were anxious to bring only grain of the first quality to market, have hit upon.

Mode of washing Smutty Grain.

Water from wells, springs, or streams, may be used with equal effect; to employ it, proper vessels must be procured, as buckets, shallow tubs, and casks, open at one end; but in preference to these, a large flat cistern with a sluice, the inside of which should be covered with a piece of linen, or of tin perforated to facilitate the escape of the water impregnated with the smutty matter, and to prevent the passage of the grain. This operation is more easily performed, when near the water; in that
case

case the wheat may be washed in baskets so close as to retain the grain. The mere motion of the water is insufficient to detach the dust from the wheat ; it must be stirred with a broom, and rubbed with the hands, in small quantities at a time ; the foul water must be let out of the cistern, and fresh water put upon the wheat, until it runs off clear. If it is washed at a river or a well, the basket must be plunged in it several times. It is, however, to be observed, that this operation must be performed as quickly as possible, that the grain may be washed, without being softened, to prevent the difficulty in drying it, and to avoid wrinkling the skin.

Drying the washed Grain.

The moment the grain is taken out of the water, it ought to be spread on cloths in the open air ; in the southern provinces, where it is customary to wash grain, it is dried in the sun. This method is preferable to any other, and at the same time the most economical ; and in our climate (France) a cogent reason for washing smutty grain, immediately after harvest, is to take advantage of the heat of the sun,

fun, in the latter end of August, or the beginning of September; besides, the sooner the grain is washed, the more easy and effectual is the operation.

If the weather will not permit the grain to be dried in the open air, it must be spread very thin on the floor of the granary, and often turned to prevent its heating, and to allow a free escape to the adventitious moisture. If the weather happens to be moist and warm, and likely to make it sprout, it should be dried in an oven moderately heated. In whatsoever way the grain has been dried, care must be taken not to leave it in heaps, nor to press it closely together, until it is perfectly cool; and has been passed two or three times through the riddle.

Of the advantages of washing and drying grain.

These operations are not difficult; they only require time, and the farmer, who performs them, will not have occasion to regret the moments thus employed, when he reflects on the consequent advantages. These advantages are, the power of preserving his grain, or of using it immediately, or of mixing it with
old

old grain, without any inconvenience. It restores to wheat its natural facility in grinding; it makes the produce in flour greater than when unwashed; and the flour has not that dirty whiteness, and disagreeable smell, attendant on smutty grain; it is more easy to keep, and it absorbs more water in baking. Bread made from this wheat has all the qualities, that can be wished for in this aliment. If the grain is to be sold, it acquires at market a value of one fourth above that which is smutty. But it may be objected, that by washing wheat it loses the quality of *handling well*, and from this circumstance suffers a diminution in value. On this it must be remarked that, if the operation is quickly executed, particularly if the grain is dry, the skin will not be penetrated by the moisture, that it will not be wrinkled, and will preserve its size and smoothness. Its loss of weight will be small, when compared with the advantages above stated.

In all circumstances, which have required it, this practice has been followed with success, both by great and small farmers, by millers who deal in wheat, and by private persons who manufacture their own flour. It is the constant mode pursued by the best bakers, who otherwise could not make bread of the
first

first quality in those seasons when smutty wheat is common, and in such years has been the means of enriching those active and intelligent persons, who have had recourse to it.

Reflections.

After what has been mentioned in this Memoir, the farmer may be convinced, that nothing but washing and drying can remedy the disadvantages of smutty wheat. It is then his interest to perform this operation, because, if he does it not, the miller or the baker will do it for him, and have all the advantage, which he might obtain for himself.—Even for his own consumption he ought to practise it, as both himself and his family will eat better bread, which costs less in baking: in a word, he ought to employ this method, as well for his own credit, as for the sake of humanity, because flour made from wheat thus prepared cannot be unwholesome, and thus the farmer will be free from all uneasiness on this subject, and from every well founded reproach.

Observation by the Translator.

The climate in France being so much warmer than ours, is the reason the author mentions

tions ovens for the purpose of drying wheat ; in close and moist weather, after washing, the sun and air being in general sufficient to prepare wheat for grinding, kilns are not in use as with us, where all grain, unless kept a considerable time on the straw, requires that process to make it *work* ; nor will it keep in any considerable quantity unless kiln-dried, and even in that state it requires constant turning ; therefore to millers, who always dry their wheat, and who of course are near to water, the operation of washing seems peculiarly adapted, in seasons when the smut is common.

The author does not seem to be acquainted with lashing of wheat to free it from the straw ; when this operation is performed, the smut balls are not broken as they are by the flail, and consequently less of the black powder adheres to the grain ; and the balls, being lighter than the wheat, may be separated by repeated and careful winnowing. But the second quality, which is obtained by threshing, after lashing, and amongst which the smut balls are broken, ought certainly to be washed.

THE
S P E E C H
OF THE
RIGHT HON. LORD CARRINGTON,
DELIVERED AT
THE BOARD OF AGRICULTURE,
ON TUESDAY MARCH 15, 1803.

FROM THE ORIGINAL LONDON EDITION,
Printed by Order of the Board, and communicated
to the Dublin Society.

THE

S P E E C H,

&c. &c.

ALTHOUGH it was usual for our two last Presidents to lay before the Board, every year, a detailed account of all that had been done, and all that was proposed to be done, towards accomplishing the objects of our Institution, and afterwards to give the same to the public as a printed speech, I have not hitherto thought it necessary to adhere to this custom : but at the present moment, when I am about to quit the Chair, I have reason to believe that some account may be expected from me, of the conduct of the Board, during the period of three years, in which I have had the honour to pre-
M fide.

side. I will therefore endeavour to recall to mind some of the leading particulars of our transactions, which, either from their own importance, or the peculiar circumstances attending them, have most attracted my attention.

Indeed, it cannot be thought necessary to arrange and class, under distinct heads, all the occurrences of our weekly meetings. They comprehend whatever relates to the improvement of the agriculture of the kingdom, in its various branches, and are well known to most of those who hear me. To excite emulation and promote inquiry ; to encourage and diffuse improvements in the construction and use of instruments for abridging labour ; in adapting a proper rotation of crops, and a judicious selection of manures, to different soils ; and to endeavour, for all these purposes, to combine the results of science with the practical knowledge of agriculture : to discuss and consider new projects ; to recommend such as are useful ; to discountenance such as are visionary and impracticable ; and, above all, to infuse into the minds of those honorary members, that come among us, a just sense of the importance of the study of agriculture as a science, and of the practice as an art ;—
these

these have been our constant occupations : and if it should appear that, in some instances, our just expectations of success have been disappointed, still I think it must be admitted, on a review of our proceedings, that we have been usefully and honourably employed—honourably to ourselves, because usefully for the public. Passing by, therefore, the large field to which I have pointed, I shall content myself with noticing a few of the most prominent features of our proceedings.

The first, and indeed the most important object of our attention, arose out of the scarcity in the year 1800. Early in the spring of that year, the Board, with a wise and prudent foresight, took into consideration the state of the country, respecting wheat-corn ; they had reason to apprehend that the stock was nearly exhausted, and were anxious to ascertain, as far as it could be then ascertained, what was the general expectation of the ensuing crop. For this purpose, I was directed to write letters of inquiry to all parts of the kingdom. The result was, with few exceptions, a full confirmation of the fears of the Board ; little being left of the last year's crop, and the expectation of the growing one being rather under the usual average on the dry and warm soils, and very deficient on the clays and cold
M 2 lands.

lands. After much consideration on the subject, no remedy occurred to the Board, so certain, safe, and economical, for supplying the expected deficiency, as the importation of a sufficient quantity of rice from India.

I had previously consulted with some of his Majesty's ministers, who, in consequence, made such communications to the India Company, as led to an agreement on their part, to allow the importation of rice from India, duty-free : but with specific directions to their Servants, " that (whether individuals should engage or " decline embarking in these speculations) " they were by no means to send any on the " Company's account."

This permission, so restricted, appeared to the Board a precarious and inefficient remedy. In the month of June, I was therefore requested to communicate to the same quarter the apprehensions of the Board, together with the letters which I had received in confirmation of them. Notwithstanding I met with every mark of attention from government, yet from some cause, to me unknown, though doubtless unavoidable on the part of the Directors, no alteration seems to have been made in the orders sent out to India ; nor did the letters, conveying those orders, bear date till the 28th
of

of August. The parliamentary bounty on the importation of rice (which guaranteed a selling price of 35s. per cwt.) was, on the 2d October following, unfortunately suffered to expire. What followed we all remember. The scarcity grew more urgent, and his Majesty was advised to call Parliament together early in the winter, to consider the best means of relief. The bill granting a bounty on the importation of rice, &c. was renewed, and continued to a long period. Great encouragement was held out to send ships to India; and nineteen thousand tons of rice were imported from thence; but unfortunately it did not arrive till after the abundant harvest of 1801.—The article, in consequence, became a mere drug, and the government was called upon to pay no less a sum than three hundred and fifty thousand pounds, to perform the parliamentary guarantee to the importers. It is evident, that had it been possible for the exertions, which took place afterwards, to have been used with the same promptitude and success on the first application of the Board, besides the great relief which would have been afforded, this whole sum would have been saved; as the rice would then have arrived at the most critical period of the scarcity, and have borne a high price. Nor is this all—to the pecuniary
loss

loss must be added, whatever was the difference in price at that time, and large it must have been, between a proportionate quantity of foreign corn imported (not less perhaps than four hundred thousand quarters) and the cost and charges of the rice in question. Not wishing to dwell longer upon this subject, I shall only express my regret, that the Board was deprived of the satisfaction, which they would have felt, had the information, which their diligence had procured, and the timely suggestions founded upon it, been the means of averting any of the sufferings of the public at that important crisis.

The next topic for your notice was one, which has been made the pretence for calumny, misrepresentation, and invective, greater than, I think, have been often before thrown upon a public body. Upon a cool and deliberate review of our conduct upon that occasion, I feel nevertheless, that the Board is not only undeserving of censure, but, in my judgment, entitled to commendation. I allude to letters sent by order of the Board to the Sheriffs of the different counties, to be laid before the Grand Juries at the summer assizes in the year 1800. The origin of that transaction
you

you well remember. After the Board had suggested the measure above-mentioned for relieving the existing scarcity, they naturally turned their attention to the best means of preventing its recurrence; and nothing appeared so likely to prove effectual for that purpose, as the enclosure of the waste lands. In the midst of their inquiries, they received from the very respectable Baronet, who acted as foreman of the Grand Jury of the county of York at the preceding assizes, certain resolutions upon this very subject, which had, unknown to the Board, been entered into by that body. These resolutions contained very forcible statements of the great fluctuations of the price of corn in late years; of the insufficiency of the produce of the country for its consumption; and of the consequent necessity of converting to productive husbandry the immense tracts of uncultivated wastes. The various proofs of these propositions were enumerated, and a recommendation was addressed to their representatives, to endeavour to obtain parliamentary authority for such enclosure.

This communication exactly coinciding with the ideas of the Board, it occurred to them, that

that a concurrence of other Grand Juries to the same point might be the means of forwarding the object; and I was therefore directed to transmit the resolutions of the county of York to be laid before the Grand Juries of the different counties at the summer assizes. The answers from most parts of the country were highly favourable to the proceeding, and I was little aware of the attack, that was in contemplation.

It so happened, that amongst the resolutions of the county of York, which run to great length, there had been introduced, towards the close of them, an observation, that the practice of taking tithe in kind was an obstacle to the improvement of agriculture; and an opinion was given in favour of a fair and just commutation. This suggestion, however, was only collateral to the principal object, and had therefore not attracted at that time the attention of the Board, which had wholly and exclusively been bestowed on the waste lands; and I do not believe that a single member recollected, that the subject of tithes, in general, had been touched upon. But in the spring following, when, as chairman of a committee appointed

pointed by the house of Lords on account of the dearth of provisions, it became my duty to bring in a bill for enclosing the waste lands (which had the misfortune to displease the great legal authorities in that house), a formidable attack was made, not so much upon the bill directly, as upon the Board of agriculture. Its views and its conduct were represented as inimical to the church-establishment: the application to the Grand Juries was severely reprobated; the only object of which was supposed to be an attack upon the institution of tithes, under the pretence of enclosing the waste lands. The language of those surveyors, who, at the commencement of the Board, had animadverted on this subject, were alluded to, as proofs to the same effect. In vain I stated, that though it was impossible to deny that the collection of tithe in kind operated unfavourably to agriculture, yet that it never had been the intention of the Board to call in question the general propriety of tithes as a provision for the clergy; this being a subject, which on no occasion they had ever discussed, conceiving it not to be immediately within their province; that the observations upon tithes, which

which had been complained of, were printed many years ago ; and that the Board had, in the title-page of those very books, expressly disclaimed all responsibility for the particular opinions contained in them ; each of those publications being intended merely as a general sketch (to be corrected by future inquiry) of the agriculture of the particular county, to which it related. In vain I urged this, and more. The opinions thus disclaimed were nevertheless made the grounds of attack upon the Board of agriculture, by those law Lords who disliked the bill, which, whatever might be its defects, was certainly as little liable to endanger the church-establishment, as it was, in the opinion of those who framed it, well calculated to promote the agricultural interests of the kingdom. The sentiments, which these great authorities uttered in debate, have been since frequently revived and enlarged upon in some of the most violent periodical publications, as undeniable proofs of a conspiracy of the Board of agriculture against the church of England.

I shall not trouble you to hear again the resolutions of the county of York, as they
have

have been frequently before us ; but in recalling your attention to the proceedings of the Board upon them, allow me to ask, whether any fair man can be induced to believe, that the gentlemen who were present, whose names you will hear read, and who for talents, integrity, and estimation in the country, may bear a comparison even with the noble Lords alluded to, could so demean themselves, as to make a proposal, in itself avowedly unobjectionable, a cover for introducing another of a totally different nature? The Board will recollect that, at that time, not one syllable on the general subject of tithes was mentioned: the waste lands, and the waste lands alone, were the objects of our contemplation. The Secretary will now be pleased to read the resolutions of the Board, of the 20th of May, and my letter to the Sheriffs, of the 26th of June, which are irrefragable proofs of this fact.

EXTRACT

EXTRACT FROM THE MINUTES.

" Tuesday, May 27, 1800.

" PRESENT :

*" THE RIGHT HON. LORD CARRINGTON,
PRESIDENT,*

The Right Hon. Sir Joseph Banks, Bart. K. B.

The Surveyor-General of Crown-Lands, M. P.

Duke of Bedford,*

Earl of Winchelsea,

Earl of Egremont,

Earl of Hardwicke,

Lord Viscount Wentworth,

Lord Romney,

Sir Christ. Willoughby, Bart.

Sir Will. Geary, Bart. M. P.

Sir Henry Fletcher, Bart. M. P.

Sir John Call, Bart. M. P.

John Conyers, Esq.

Langford Millington, Esq.

Henry Vavasour, Esq.

" The

* The Duke of BEDFORD was not present when the resolutions passed, but his Grace's name was inserted in the Minutes by his particular desire.

“ The resolutions of the Grand Jury of the county of York being read,

“ *Resolved,*

That a circular letter be written by the President to the High Sheriffs of the respective counties of the kingdom, enclosing the resolutions of the Grand Jury of the county of York, and requesting that they may be laid before the Grand Juries for their consideration, at the ensuing summer assizes :

“ *Resolved,*

“ That this Board will, immediately on its meeting after the recess, take into consideration the propriety and utility of a general enclosure bill, and particularly the best method of enclosing small commons and wastes :

“ *Resolved,*

“ That, in the mean time, any information, that can be communicated on the above subject, will be thankfully received by this Board, by letter addressed to the President :

“ *Resolved,*

“ That the Board earnestly recommends the consideration of this interesting subject in all its branches, to the official, ordinary, and honorary members; and that they will be pleased

pleased to communicate the result of their inquiries to the Board, by letter to the President."

(CIRCULAR.)

Copy of the letter from the President of the Board of Agriculture to the High Sheriffs, dated June 26, 1800.

" The Board of Agriculture, deeply impressed with the distress occasioned by the great scarcity of the necessaries of life, have turned their serious attention to the best means of preventing a similar calamity in future. The result of their inquiry is an opinion, that the enclosure of waste lands and commons is one of the most likely means to effectuate this end. It gave me therefore much satisfaction to receive, from the Grand Jury of the county of York, a copy of certain resolutions, which they had unanimously entered into, at the last assizes, on this interesting subject. The scarcity

city has since so much increased, as to render their observations every day more forcible and just.

“ I am desired by the Board to transmit to you these resolutions, and to request that you would be pleased to lay them before the Grand Jury of the county of _____, at the ensuing summer assizes, together with the resolutions of this Board, which I have also the honour of sending enclosed. It is impossible to call the attention of the public to a subject of greater national importance; and should the respectable bodies, to which I have addressed myself, express their opinion in favour of the measure, by adopting these resolutions, or by framing others more congenial to their own sentiments, I cannot but entertain the most sanguine hopes, that the attention of the Legislature may be speedily directed to carry these desires into effect, as the Board has already received, from several members of both houses of Parliament, assurances that they will support any practicable plan of a general enclosure, which may be brought forward.

“ I have the honour to be,

&c. &c. &c.

(Signed) “ CARRINGTON,
“ *President.*”

But

But it was also urged by the opponents to the bill, that an application to the Grand Juries, on any subjects but those for the cognizance of which they are assembled, must necessarily be improper. I am free to admit, that Grand Juries ought never to be made parties to political discussions, though I believe that some of those, who most vehemently objected to the conduct of the Board, have, in times of great party heat, not always felt themselves restrained by this consideration. But I must contend that, to help forward a plan for cultivating the waste lands, it would be difficult to find any gentlemen more exactly fitted to act, than that description, of which Grand Juries are composed; or any, whose opinions would have a greater effect on their representatives in Parliament. They are always men of liberal education; many of them acting magistrates; and coming from different parts of the country, must, from personal observation, be able to judge of the relief to be expected from this measure, in their particular districts.

With regard to the bill, which, as chairman of the committee of the house of Lords, I had the honour of proposing in Parliament, and which failed of success, it would lead into
too

too much detail, to enter fully into the consideration of it ; and I am the less induced to do so, because, as I have already hinted, the objections made to the bill rested chiefly on the general imputations cast on the Board of Agriculture, and not so much on any examination into the nature of its provisions. I will only say, that it was framed after mature deliberation, and seemed to be most peculiarly applicable to two descriptions of waste lands, namely, those where the commons are so large, and the rights so mixed between different parishes, that it is almost impracticable, in the ordinary way, to obtain consents ; and next, to those wastes, of which the number in this country is immense, where the quantity of land is too small to bear the expence of a separate bill. But it was hardly to be expected, that a measure, which innovated on the common practice respecting enclosures, and which, though without foundation, was considered as annihilating or abridging the profits of large descriptions of individuals, should pass without opposition. I should, however, have pressed the bill forward, regardless of the formidable battery which had been raised against it, but unfortunately the Committee of Lords, who framed it, suffered, in an evil hour, one of its leading provisions to be altered in a manner that, in my opinion,

N

would

would have made the bill in a great degree nugatory and ineffectual: I was therefore as anxious to have it withdrawn as any of those noble Lords, who opposed it.

Since that time the bill has not been renewed, nor has the Board taken any subsequent measures on the subject. Their conduct, in this respect, has my full approbation. The crisis, in which the bill was produced, was particularly favourable to it. A scarcity, almost approaching to a famine, existed, and this measure was loudly called for by the public. If, under such circumstances of pressure, those, who had it in their power to administer the remedy, could suffer the passions, prejudices, or interests of others, so to mislead their judgment, what have we at this time to expect from the attempt? If, after the fatal experience of more than twenty millions sterling having been sent to foreign countries for the purchase of grain, within the short period of a very few years, they can shut their eyes upon the past, and consider the present abundance as perpetual; if they can still condemn millions of acres, which are capable of every kind of produce, to remain dreary wastes—I can impute it to little less than a species of infatuation. The case seems to me desperate; and I
may

may almost say of them, in the forcible language of Scripture, "Neither will they be persuaded, though one rose from the dead."

The next important object, that engaged the attention of the Board, was occasioned by a requisition from the House of Lords, who in their inquiries into the means of removing the dearth of provisions, conceiving that many of the lands now under grass might be advantageously converted into tillage, applied to the Board for advice, under what regulations this change might be safely made. The Board, fully aware of the importance of the subject, and desirous of calling the public attention to it, proposed, by advertisement, to give premiums for essays on "the best method of converting grass-lands into tillage, and, after a certain time, of restoring them to grass again, with improvement, or at least without injury." This application from the Board had a great effect; no fewer than between three and four hundred essays, from all parts of the country, were transmitted. Much time and labour were spent in examining their respective merits: and to no member of the Board were we so much indebted on that occasion, as to the noble Duke, who is now unhappily no more.

To prevent even the possible suspicion of any improper bias, the essays were directed to be sent with marks, or mottos, and were adjudged by the Board without any knowledge of the names of the respective authors ; and I have the satisfaction to say, that the principal rewards fell to those who, in the opinion of the country, stood the highest for agricultural skill and talents. The Board, in this very delicate business, rendered more difficult by the great mass of matter, and the number of claimants, had the full reward of their pains and labour : and though I am not so presumptuous as to assert, that the judgment of the Board was in every case precisely according to the merit of the author, yet I think I may affirm, that there are very few instances to the contrary ; and that no measure, in which the Board was ever engaged, gave greater satisfaction to the public, or produced more useful information. A part has already been published, and I flatter myself that another volume on the same subject will soon be ready.

While the Board was employed in these domestic objects of attention, it felt itself happy in becoming the medium of sending to the West Indies some of the most valuable productions of the East Indian islands, within the same climates.

climates. From Dr. Campbell, an ingenious botanist in Sumatra, they have obtained several parcels of seeds (with accounts of their nature and properties), which, if they should succeed, may prove most valuable acquisitions to the West India islands. They are at present on trial; but the House of Assembly in the island of Jamaica have already been so sensible of their importance, that by an unanimous vote they have returned their thanks to your president. A gold medal, the highest honorary reward bestowed by the Board, has been sent to Dr. Campbell, and I have no doubt that further supplies and greater varieties of seeds may soon be expected.

Before I conclude, I must beg leave to notice a few circumstances of our domestic concerns: And first, with regard to our publications.

I can truly say, that much the most painful and difficult part of my duty has arisen from prejudices excited by some of the early publications under the authority of the Board. I have already stated, that these were published merely as hints and conjectures, and that the Board expressly disclaimed all responsibility as to the particular opinions advanced. It must, however, be admitted, that some of them were
suffered

suffered to be printed without due examination, and that it will be our duty to expunge every exceptionable passage from the future editions. Indeed the Board has very strictly watched over their publications for the last three years; and though they are fewer in number than formerly, yet I may venture to flatter myself, that they are more correct, at least, that they contain nothing liable to the same sort of objections.

It is much to be wished, that the amended reports of the agriculture of the different counties could be completed; but a sufficient degree of agricultural knowledge is so rarely united to the power of explaining it with perspicuity and method, that, notwithstanding all my endeavours, I have seldom succeeded in finding persons with sufficient ability and inclination to undertake this work. But as it is one of the greatest importance, I hope that the Members of the Board, in their respective counties, will search out for the most proper persons, and that they will also direct, encourage, and assist them in the execution.

With regard to our finances, I must do the noble Lord, who preceded me, the justice of declaring, that he left them relieved from the embarrassments, to which they had formerly
been

been subject. At present I have the satisfaction to say, that their situation is considerably improved; and yet I believe that no proper expense has been spared, but that, in all our proceedings, we have acted with a just liberality, which, with means as limited as ours, can rest only on the basis of economy. Our outgoings must necessarily be large. The two secretaries deserve and receive considerable allowances; the other gentlemen in the office have also just claims to the remuneration bestowed on them. We are obliged to incur a considerable expense for rent, taxes, stationary, and office incidents. A large piece of ground at Brompton is kept in hand for experiments, with suitable persons to superintend them.— Add to this, honorary rewards (which in the single case of the essays on grass-lands, amounted to upwards of four hundred pounds, in addition to the grant for that purpose from government), the sums paid for surveying countries, for forming a collection of books in agriculture, for purchasing models and implements; and when it appears, that all this is done from a parliamentary grant of only three thousand pounds a-year, subject to the payment of fees, and that we have now a considerable balance in hand, after having discharged all demands upon us, I think the Board cannot be denied the

the merit of an attentive and judicious administration of their affairs, and that their conduct may be brought as an example to others, how much may be done, with means comparatively small, when under the direction of a prudent management.

I cannot conclude without adverting to a subject, which I shall always consider as matter of peculiar pride and satisfaction to every member of this Society. I mean the uninterrupted harmony and cordiality, which has on all occasions prevailed in our intercourse with each other. A society of this nature could never be extensive enough for its purpose, nor embrace all the talents most likely to render it useful, without comprehending persons, who are in other respects divided by those political distinctions of party, which are found always to prevail in this free country. Under the influence of these political distinctions, we have every day reason to see, how difficult it is for those to act together kindly, even in the ordinary affairs of common life, who differ thus widely in their public sentiments. But, happily, in this Board, although every gentleman that belongs to it must, from his situation and rank in the country, take a part more or less active in political discussions, yet, as if by common

mon consent, the influence of every discordant opinion has been extinguished the moment he entered these walls. It is impossible to refer to any more striking instance of this liberal conduct, than in the person of the noble Duke, whose bust is now in our view, and whose untimely loss we all equally regret. To the happy prevalence of this general disposition I must attribute the perfect unanimity, which has prevailed amongst us during the whole period, to which I have alluded. No sharp, angry, or vehement debates have taken place; and I am not aware, that even a single expression has ever fallen from the lips of any member, that could wound the feelings of another.

For myself, it is impossible not to acknowledge the partiality and indulgence, which first placed me in this chair, and have since uniformly supported me in it. That persons, who by their rank, and estimation in the country, as well as by their knowledge of agriculture, are confessed by all to be fitted for the first place (and any of whom it was my sincere wish and desire to have induced to undertake it, in preference to myself), should yet have condescended to accept from me the office of Vice-Presidents, must ever be highly gratifying to my feelings. With respect to the other members of the Board, where I am so much indebted to

all, it may not perhaps be strictly proper to mention any ; but I cannot help saying, that to two of the official members, namely, the *President* of the *Royal Society*, and the *Surveyor-General* of the *Crown-lands*, I am under the most particular obligations : the various and extensive abilities of these gentlemen have been assiduously and uniformly exerted in assisting my endeavours. It would be ungrateful to deny, that their knowledge has instructed my ignorance ; their information and experience have on every occasion aided or corrected my judgment ; and their vigour and activity of mind have materially diminished the difficulties, which I should otherwise have had to encounter, even in my imperfect attempt to discharge the duties of my situation.

To them, to the Vice-Presidents, and to the other members of the Board, I once more beg leave to return my thanks. It is my most ardent wish, that their labours may long be continued with equal zeal and judgment, and with increasing credit to themselves, and advantage to the public. The same kind and liberal protection, which I have been fortunate enough to experience, will, I am sure, be extended to the person, whoever he may be, whom their choice may destine to be my successor. It is that, which can alone enable him to discharge with confidence

confidence and success his duty to the Board, and effectually to promote the wise ends of its institution.

Note. On the motion of the Earl of Egremont, seconded by Lord Viscount Newark, it was resolved unanimously, that the thanks of the Board be given to Lord Carrington the President, for the eloquent speech, which he has just delivered from the chair; and that he be requested to furnish the minutes of the same, to be entered amongst the proceedings of the Board, as it contains, in their opinion, a just and satisfactory illustration and defence of the views and conduct of the Board during his Lordship's presidency.

FINIS.

1607

PRESERVATION SERVICE

SHELFMARK 963 b.24.....

THIS BOOK HAS BEEN
MICROFILMED (1989)

MICROFILM NO C.9299.....

RECOVERED
1935.